BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI JANUARY, 1942 NO. 1

TREES

IN THE BROOKLYN BOTANIC GARDEN

1942

GUIDE NO. 13

PRICE, TWENTY-FIVE CENTS. BY MAIL THIRTY CENTS

PUBLISHED QUARTERLY
AT PRINCE AND LEMON STREETS
LANCASTER, PA.
BY THE
BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

Scientific, Educational, and Administrative Officers

SCIENTIFIC AND EDUCATIONAL

The Staff

C. STUART GAGER, Ph.D., Sc.D., Pd.D., *Director*
MONTAGUE FREE, Certificate, Royal Botanic Gardens, Kew, *Horticulturist*
ARTHUR HARMOUNT GRAVES, Ph.D., *Curator of Public Instruction*
ALFRED GUNDERSEN, Docteur de l'Université (Paris), *Curator of Plants*
WILLIAM E. JORDAN, B.S., *Librarian*
GEORGE M. REED, Ph.D., *Curator of Plant Pathology*
ELLEN EDDY SHAW, M.A., *Curator of Elementary Instruction*
HENRY K. SVENSON, Ph.D., *Curator of the Herbarium*
MARGARET M. DORWARD, A.B., *Assistant Curator of Elementary Instruction*

Other Officers

MARY AVERILL, *Honorary Curator of Japanese Gardening and Floral Art*
HAROLD A. CAPARN, *Consulting Landscape Architect*

RALPH CURTISS BENEDICT, Ph.D., *Resident Investigator (Ferns)*
RALPH H. CHENEY, Sc.D., *Resident Investigator (Economic Plants)*

G. ELIZABETH ASHWELL, A.B., *Curatorial Assistant*
MICHALENA LEFRERE CARROLL, *Instructor*
EMILIE PERPALL CHICHESTER, *Library Assistant*
ELIZABETH CLARKE, A.B., *Curatorial Assistant*
CHARLES F. DONEY, M.S., *Assistant in Woody Plants*
WILLIAM H. DURKIN, *Curatorial Assistant*
ELSIE TWEMLOW HAMMOND, M.A., *Instructor*
FRANCES M. MINER, A.B., *Instructor*
HESTER M. RUSK, A.M., *Instructor*
MARGERY H. UDELL, *Curatorial Assistant*
L. GORDON UTTER, M.S., Ph.D., *Research Assistant*
JEANNE PHYLLIS WALTHER, A.M., *Research Assistant*

LOUIS BUHLE, *Photographer*
MAUD H. PURDY, *Artist*

ADMINISTRATIVE

THOMAS A. DONNELLY, *Secretary and Accountant*
EDNA PALMITIER SCHACHT, *Assistant Secretary*
JANE E. COFFIN, *Office Assistant*

MARIE-LOUISE HUBBARD, A.M., *Secretary to the Director*
FRANK STOLL, *Registrar and Custodian*

LAURA M. BREWSTER, *Stenographer*
VIRGINIA A. CLAY, *Stenographer*
CONSTANCE PURVES ELSON, B.A., *Stenographer*
BETTY G. RILEY,[2] *Stenographer*

[2] Beginning as of November 1, 1941.

Published Quarterly at Prince and Lemon Streets, Lancaster, Pa.
by the Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y.
Entered as second-class matter in the post-office at Lancaster, Pa., under act of August 24, 1912

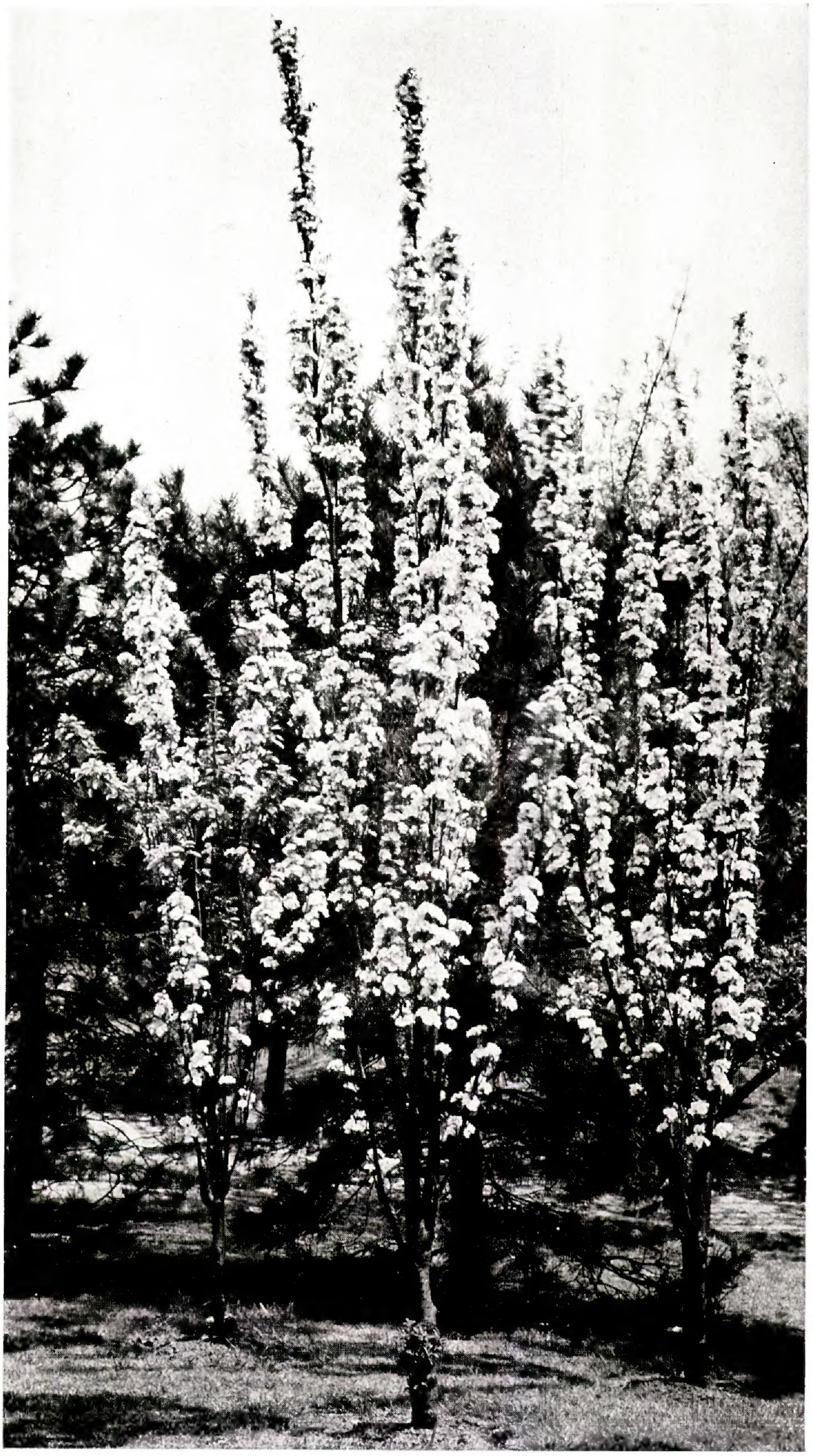


FIG. 1. Fastigiate Form of Flowering Cherry (*Prunus Ama-no-gawa, "Milky Way"*). (9397)

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI JANUARY, 1942 NO. 1

TREES IN THE BROOKLYN BOTANIC GARDEN 1942

GUIDE NO. 13

BY

ALFRED GUNDERSEN AND ARTHUR H. GRAVES

This list of trees is a companion to the *List of Shrubs* published a year ago. We have at present about 500 species of trees, representing 130 genera, and in addition more than a hundred hybrids and varieties, making a total of about 620 kinds. Some of these are still in the nursery and a few are seedlings.

The species are arranged in two columns, American trees on the left, those of Europe and Asia on the right; a vacant space implies that no species of the genus exist in that hemisphere.

The names are those of Rehder's *Manual*, Second Edition (1940) [1] with a few exceptions, about a dozen in all, which have been widely used for many years in both botany and horticulture. The numbers after the family names are approximately those of the Engler System, used in our arrangement of records, maps, and specimens.

The drawings have been made from living plants by Miss Maud H. Purdy, staff artist.

Note: The front cover illustration represents *Davidia involucrata* var *Vilmoriniana*.

ABBREVIATIONS AND SIGNS

Italics, Synonym
x, Hybrid
d, Dioecious
h, Hardiness not dependable in Brooklyn
var, Variety

[1] *Rehder, Alfred.* Manual of cultivated trees and shrubs. 2d ed. New York, 1940.

GYMNOSPERMAE

AMERICA — OLD WORLD

Ginkgoaceae (Ginkgo Family) 20

Ginkgo d

biloba (Maidenhair-Tree)
Known now only in cultivation.
var fastigiata

Taxaceae (Yew Family) 21

Cephalotaxus d

drupacea (Plum Yew) h

Taxus d

American Yew is a shrub — baccata (English Y) h
cuspidata (Japanese Y)

Torreya d

Californian Torreya is not hardy here — nucifera (Japanese T) h

Araucariaceae (Araucaria Family) 22

Araucaria

imbricata (*araucana*, Monkey Puzzle) h
Does not thrive, but has lived in our nursery about ten years

Pinaceae (Pine Family) 23

Abies

balsamea (Balsam Fir)
Does not thrive here
concolor (Colorado F)
Fraseri (Southern F)
Does not thrive here
magnifica (Noble F)
nobilis (Red F)
Fargesii
firma
holophylla
homolepis (*brachyphylla*, Nikko F)
Nordmanniana (Nordmann F)
Veitchii

America	Old World

Cedrus

atlantica (Atlas Cedar)
var glauca
Deodara (Himalayan C) h
libani (Cedar of Lebanon)

Larix

laricina (American Larch)	decidua (European Larch)
	Gmelini (*dahurica*)
	leptolepis (Japanese L)

Picea

Needles nearly quadrangular

Engelmanni (Engelmann Spruce)	asperata
	excelsa (*P. Abies,* Norway S)
glauca (*canadensis,* White S)	orientalis (Oriental S)
pungens (Colorado Blue S)	polita (Tigertail S)
var glauca	Smithiana (Himalayan S)
rubens (Red S)	Wilsonii
mariana (Black S)	

Needles flattened

Glehnii
jezoensis
Koyamai
Omorika (Serbian S)

Pinus

Five needles

flexilis (Limber Pine)	Cembra (Swiss Stone P)
monticola (Western White P)	excelsa (*Griffithii,* Bhotan P) h
Strobus (White P)	koraiensis (Korean P)
	parviflora (Japanese White P)
	Peuce (Macedonian P)

Three needles

rigida (Pitch P)	Bungeana (Lacebark P)

Pines (Figure 2)

Characterized by their needles in bundles or "fascicles," and by their generally tall and cone-shaped or columnar habit, at least in youth and middle age, pines are the most distinct botanically of all the conifers, and the most useful to man. Nearly eighty species are known, all in the northern hemisphere, only one species crossing the equator into the mountains of Java.

Pine leaves, often called needles, grow in clusters on very short branches. Seedling leaves are single, known as primary leaves. Soon, in their axils, tiny branchlets appear, each bearing the characteristic number of secondary leaves. Thereafter the primary leaves gradually become shorter, eventually being reduced to scales enclosing the winter buds.

More extensively than in any other conifer, the wood of *Pinus* is traversed lengthwise and crosswise by tiny canals—resin ducts—which transport resin through the tree. These resin ducts continue into the leaves, and the number and position of the resin ducts there are characteristic of each species. The resin, when collected and distilled, as is done with some of the southern pines, yields turpentine. The residue, after distillation, is rosin, which has a variety of economic uses—for paints, soap, sealingwax, the glaze on paper, and for medicine.

The pines may be grouped primarily into the soft, and the hard or pitch pines; the former with soft wood and sheaths of the leaf clusters deciduous at the base, the latter with harder, heavier wood, often densely impregnated with resin, and, with one exception, persistent leaf sheaths.

Best adapted for forest planting in this region is the red pine (*Pinus resinosa*), which grows rapidly, has fairly soft wood and is not injured by the white pine weevil nor subject to the blister rust disease. However, of late years it has become infested with the European pine-shoot moth (*Rhyacionia buoliana*). This insect, which infests the buds of young trees, can be controlled if the infested buds are collected in late winter and burned. As a genus, the pines are extremely valuable for forest planting because they are not particular as to soil, and will flourish in sandy or rocky sites.

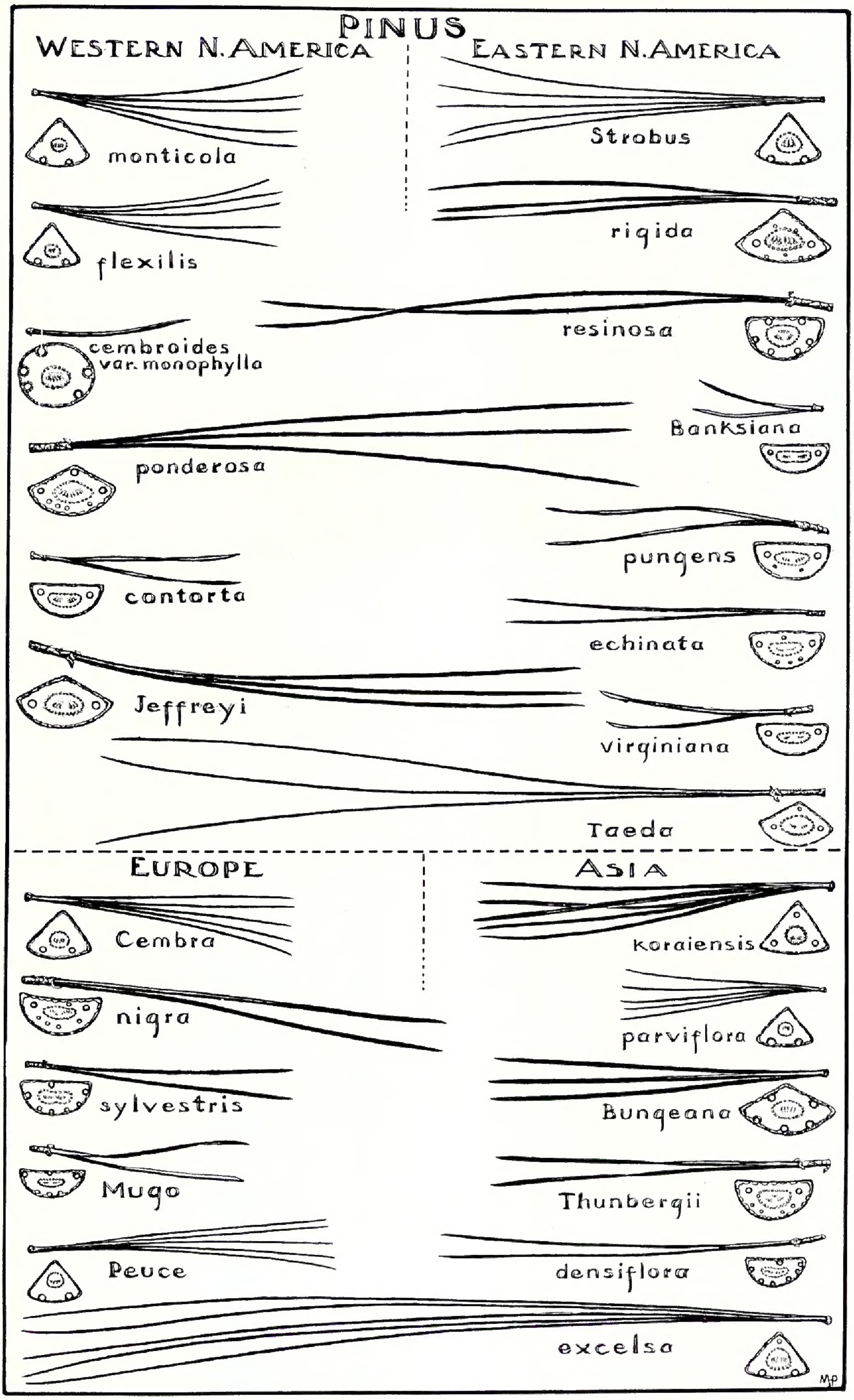


FIG. 2. Pinus—Pine. Leaves one-half natural size. Cross-sections × 6.

AMERICA OLD WORLD

Three or two needles

Jeffreyi (Jeffrey P)
  Does not thrive here
ponderosa (Western Yellow P)
  Is a shrub here
Taeda (Loblolly P)

Two or three needles

echinata (Shortleaf P)
pungens (Table Mt. P)

tabulaeformis

Two needles

Banksiana (Jack Pine)
contorta (Shore P)
resinosa (Red P)
  Does not thrive here
virginiana (Jersey P)

densiflora (Japanese Red P)
Heldreichii
Mugo (Mugo P)
nigra (Austrian P)
sylvestris (Scotch P)
Thunbergii (Japanese Black P)

One leaf or needle

cembroides var monophylla
  (Single-leaf Piñon P) h

Pseudolarix

Kaempferi (*amabilis,* Golden Larch)

Pseudotsuga

Douglasii (*taxifolia,* Douglas Fir)

(japonica, wanted)

Tsuga

canadensis (Canadian Hemlock)
caroliniana (Carolina H)
heterophylla (Western H)

diversifolia
Sieboldii

Taxodiaceae (Bald-Cypress Family) 24

Cryptomeria

japonica
  var araucarioides
  var Lobbii

AMERICA OLD WORLD

Sequoiadendron

gigantea (Giant Sequoia, Big Tree) h

Taxodium

distichum (Bald-Cypress)

Sciadopitys

verticillata (Umbrella-Pine)

Cupressaceae (Cypress Family) 25

Chamaecyparis

Lawsoniana
nootkatensis (Nootka Cypress)
thyoides (White-Cedar)

obtusa (Hinoki Cypress)
pisifera (Sawara C)
var filifera
var plumosa
var squarrosa

Cupressus

Macnabiana h

Old World Cypress not hardy here

Fitzroya

cupressoides

Juniperus

virginiana d (Red-Cedar)

chinensis (Chinese Juniper)

Libocedrus

decurrens (Incense-Cedar)

Old World species not hardy here

Thuja

occidentalis (American Arbor-vitae)
var fastigiata
plicata

orientalis (Oriental A)
Standishii

AMERICA OLD WORLD

Thujopsis

dolabrata h

ANGIOSPERMAE

DICOTYLEDONES

Salicaceae (Willow Family) 56

Populus d

balsamifera (*Tacamahaca*, Balsam Poplar)
candicans (Balm-of-Gilead)
deltoides (Cottonwood)
grandidentata (Large-toothed Aspen)
heterophylla (Downy Poplar)
tremuloides (Trembling Aspen)

Hybrids

x berolinensis (laurifolia x nigra italica)
x canadensis (deltoides x nigra) (Carolina P)
x canadensis var Eugenei

alba (White Poplar)
var pyramidalis (Bolleana)
lasiocarpa
Maximowiczii
nigra var italica (Lombardy P)
Simonii
suaveolens
szechuanica

Salix d

amygdaloides (Peach-leaved Willow)
Bebbiana (*rostrata*, Beak W)
discolor
longifolia (Sandbar W)
lucida
nigra

Hybrids

x blanda (babylonica x fragilis)
x elegantissima (babylonica x fragilis)
x sepulchralis (babylonica x alba)

alba (White Willow)
var calva
var chermesina (*vitellina* var *britzensis*)
var sericea
var tristis (*vitellina* var *pendula*)
var vitellina
amygdalina
babylonica (Weeping W)
fragilis
Matsudana
var tortuosa
pentandra
viminalis

AMERICA — OLD WORLD

Juglandaceae (Walnut Family) 60

Carya

cordiformis (Bitternut)
glabra (Pignut)
ovata (Shagbark Hickory)
Pecan var Marquardt
  var Pleas Hybrid
tomentosa (*alba,* Mockernut)

(cathayensis, wanted)

Juglans

cinerea (Butternut)
nigra (Black Walnut)
  var Stabler
  var Thomas

cathayensis
mandshurica
regia (English Walnut)
Sieboldiana

Platycarya

strobilacea h

Pterocarya

fraxinifolia (Wingnut)
rhoifolia h
stenoptera

Betulaceae (Birch Family) 61

Alnus

incana (Speckled Alder)

Hybrid
x Koehnei (subcordata x incana)
rubra
tenuifolia

cordata
fruticosa
glutinosa (European Alder)
hirsuta
japonica
nitida
subcordata

Betula

Bark white

papyrifera (Canoe B)
  var kenaica
  var neoalaskana
  var occidentalis
populifolia (Gray B)

mandshurica (*japonica*)
pendula
  var fastigiata
  var gracilis
  var tristis
pubescens

Birches (Figure 3)

A genus of about thirty species, mainly trees, though a few are shrubs, with simple, toothed leaves which are not distinctive. A prominent feature is the bark, separable in some species into thin, papery plates, and characterized by longer or shorter, transverse dashes which contain the lenticels. The naked catkins of staminate flowers are mostly erect on the branches during the winter.

One of the most distinctive botanical characters of the birch is its fruit, borne in a cylindrical structure called a fruit spur. This is composed of bracts having winged nutlets in their axils, and arranged in a close spiral. The shape of the bracts is fairly constant for each species, also the size of the nutlets and the comparative width of their wings.

During the winter these fruit spurs stand more or less erect on the branches. The jarring effect of winds and storms causes them gradually to lose the bracts and nutlets, which one can find sown on the snow beneath. A knowledge of the shape of the bracts is an important aid in determining the species.

Among the trees of northern New England and New York and westward as far as the Rockies, the Paper Birch or Canoe Birch (*Betula papyrifera*) is perhaps the most beautiful, certainly the most striking of all. With its gleaming white bark and tall, straight trunk it stands out in marked contrast to its neighbors. This is the tree whose light, strong bark, in separable sheets, was used by the Indians for canoe manufacture. Although a lover of the cool northern woods, it takes kindly to cultivation as an ornamental tree. In North America no other tree grows farther north than the paper birch. In Europe, *Betula pubescens* goes nearly as far north as the North Cape, and is still a small forest tree at 70°, north latitude.

The birches, though useful as timber trees, are popular for ornamental planting, particularly the white-barked species, as much for their graceful branching habits as for the coloration of their bark.

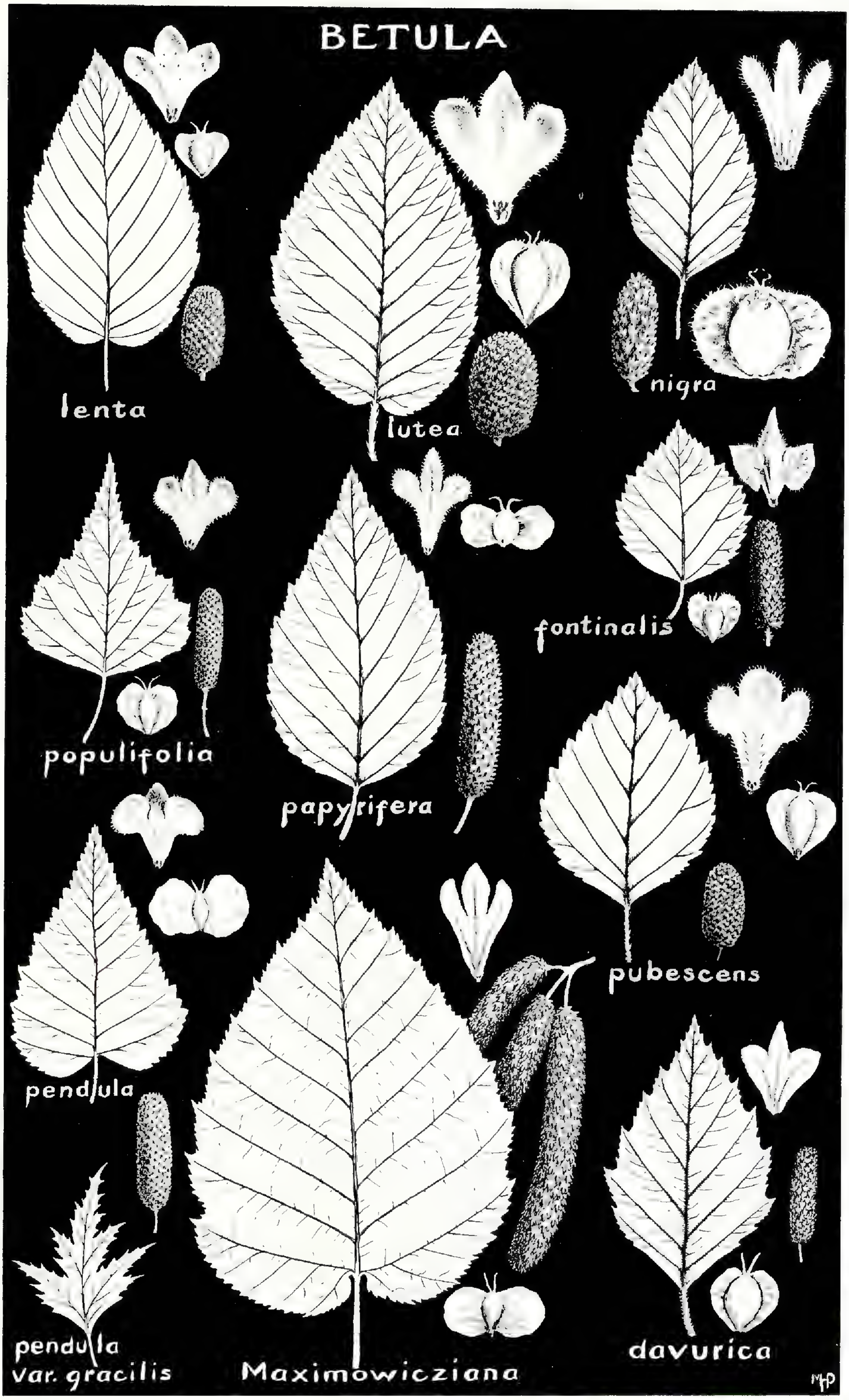


FIG. 3. Betula—Birch. Leaves one-half natural size: bracts and nutlets, two and one-half times natural size.

America	Old World
Bark not white	
fontinalis (Western Birch)	chinensis
lenta (Black B)	davurica
lutea (Yellow B)	Ermani
nigra (Red B)	grossa
	Maximowicziana
Carpinus	
caroliniana (American Hornbeam)	Betulus (European Hornbeam, Blue-Beech)
	cordata
	japonica
	Turczaninowii
	Fargesiana (*yedoensis*)
	laxiflora
Corylus	
American hazels are shrubs	Avellana (European Hazelnut)
	chinensis
	Colurna (Turkish H)
Ostrya	
virginiana (Hop-Hornbeam)	carpinifolia

Fagaceae (Beech Family) 62

Castanea	
dentata (American Chestnut)	crenata
ozarkensis	Henryi
pumila (Chinquapin)	mollissima
	sativa
	Seguinii
Fagus	
grandifolia (American Beech)	orientalis
	Sieboldii
	sylvatica (European Beech)
	var asplenifolia
	var atropunicea
	var laciniata
	var pendula
	var Zlatia

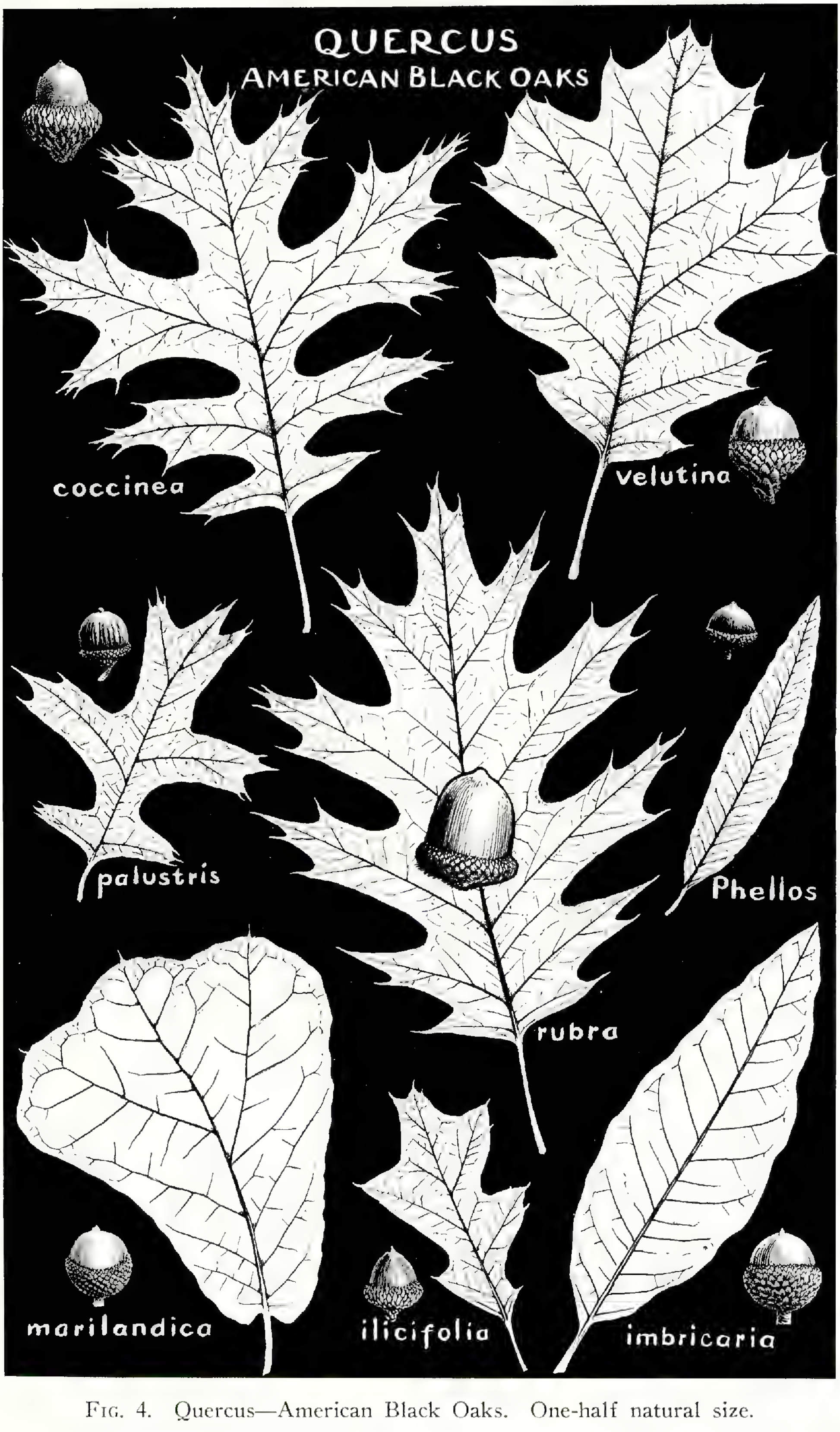


FIG. 4. Quercus—American Black Oaks. One-half natural size.

Oaks (Figures 4–6)

There are more than two hundred species of oak. Of those native in North America, about fifty attain tree size. Oaks are much planted as ornamental trees, not only because their symmetry of habit and their large size add beauty and dignity to landscape design; but also because their foliage is handsome at all times of the year, especially in the fall, when some species, e.g. the scarlet oak, assume brilliant autumnal tints. They are by no means always symmetrical trees; aged individuals often present a gnarled and twisted appearance which also has its aesthetic value in landscape art. The oak, a synonym for strength, sturdiness, and virility, is notably a long-lived tree; in some species its span of life extends to more than 1,000 years.

In addition to the ornamental value, many species are important timber trees; the bark of some is rich in tannin and is used for tanning leather; the acorns of some are edible, and nearly all species produce wood which is valuable as fuel and useful in the manufacture of charcoal.

We may divide the oaks into two chief classes based mainly on characters of leaves and acorns. These are the Black Oaks, which have leaves with bristle-tipped lobes and require two years for the ripening of their acorns; and the White Oaks, whose leaves have rounded lobes or sinuate teeth, usually without bristle tips, and which require only one year to mature their acorns. In the first class we have included *Quercus Phellos* and *Q. imbricaria*, whose leaves, being almost entire and willow-like, put them in the sub-class, "Willow Oaks." In the second or white oak class we have included some of the Chestnut Oaks, whose leaf and acorn characters stamp them as a sub-class of white oaks. These are: *Quercus bicolor*, the swamp white oak; *Q. montana*, the chestnut oak; and *Q. prinoides*, the chinquapin oak; the last, indeed, usually classed as a shrub.

Q. myrsinaefolia, an evergreen oak of Japan and East China, is usually put in a class by itself, on account of its evergreen leaves and the peculiar concentric rings in the acorn cup. *Quercus Cerris*, the Turkey oak, is exceptional in that it requires two years to mature its acorns.

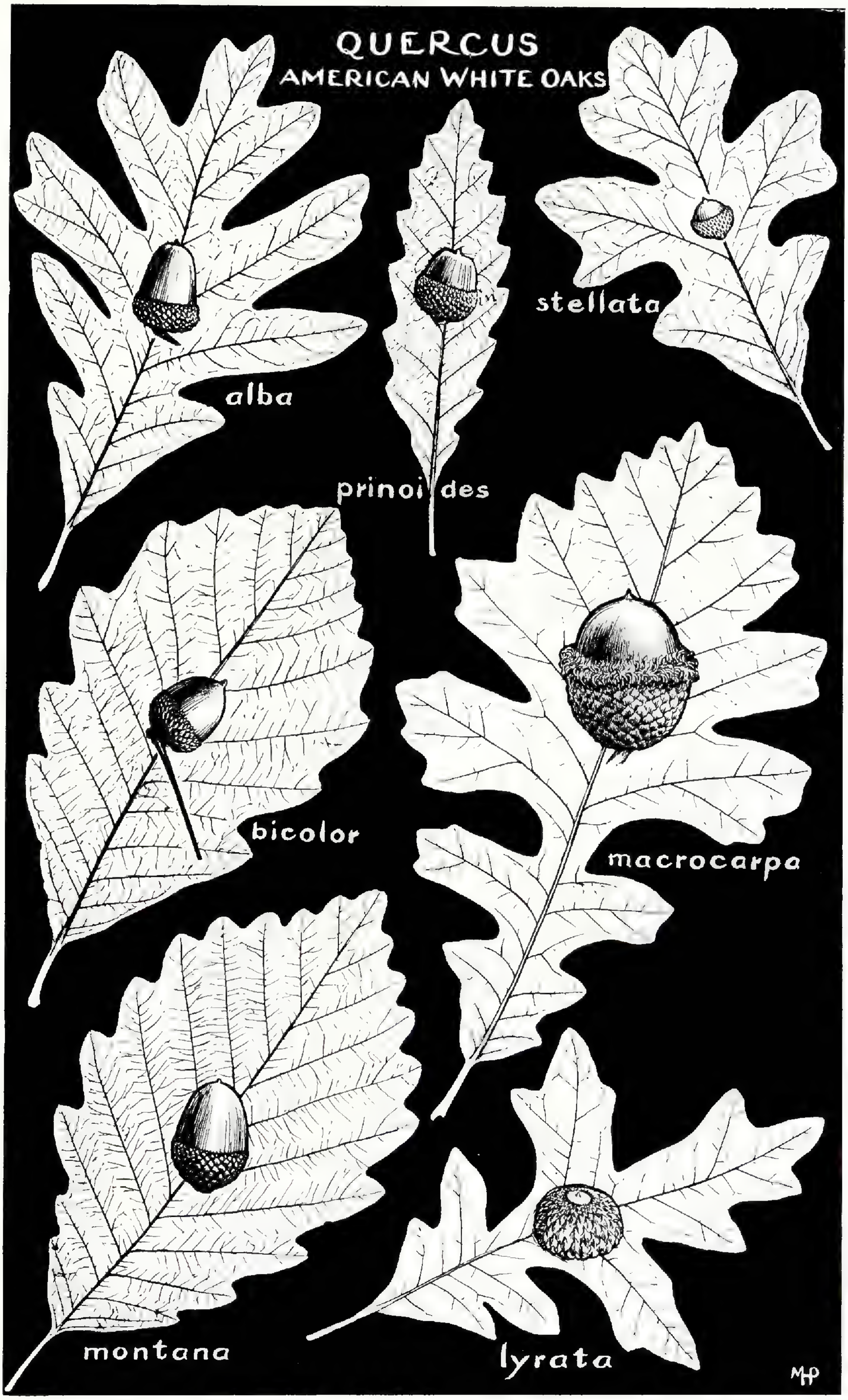


FIG. 5. Quercus—American White Oaks. One-half natural size.

AMERICA OLD WORLD

Quercus

Evergreen Oak

myrsinaefolia h

Willow Oaks

imbricaria (Shingle O)
Phellos (Willow O)

Black Oaks

coccinea (Scarlet O)
ilicifolia (Scrub O)
palustris (Pin O)
rubra (*borealis*, Red O)
velutina (*tinctoria*, Black O)

White Oaks

alba (White O)
bicolor (Swamp O)
lyrata (Overcup O)
macrocarpa (Burr O)
montana (*Q. Primus* Engelm, Chestnut O)
Gambelii
Michauxii (*Q. Primus* L, Basket O)
stellata (Post O)
undulata

acutissima
aliena
Cerris (Turkey Oak)
Dalechampii
dentata
glandulifera
libani (Lebanon O)
mongolica
robur (English O)
var fastigiata
sessiliflora (*petraea*)

Hybrids

x Rudkini (Phellos x ~~velutina~~ marilandica)
x heterophylla (Phellos x rubra)
x Saulii (montana x alba)

Ulmaceae (Elm Family) 63

Aphananthe

aspera

Celtis

occidentalis (Hackberry)

sinensis

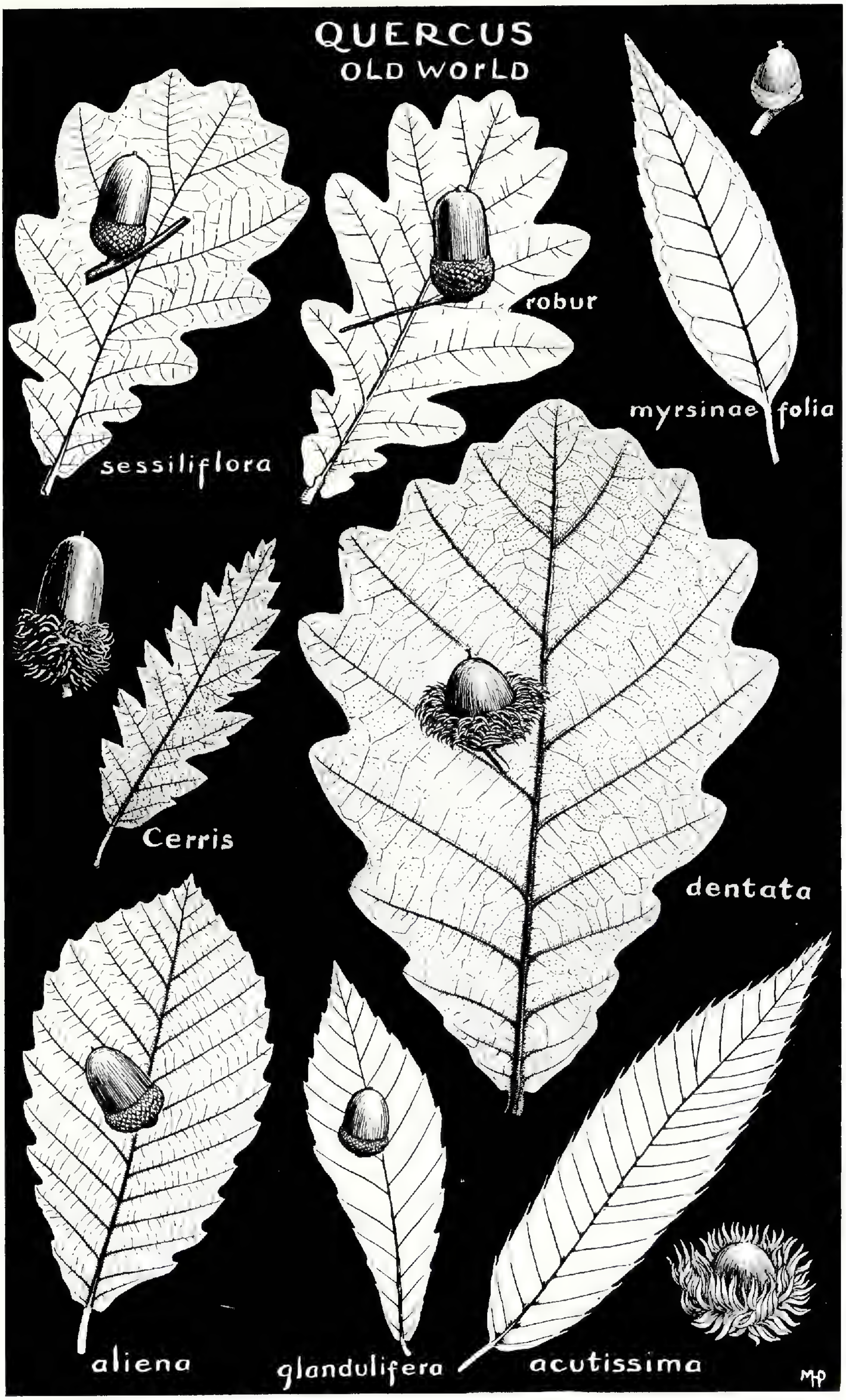


FIG. 6. Quercus—Old World Oaks. One-half natural size.

AMERICA OLD WORLD

Hemiptelea

Davidii

Ulmus

americana (American Elm)
fulva (Slippery E)
Thomasii (*racemosa*, Rock E)
serotina (Red E)

Davidiana
glabra (Scotch Elm)
var Camperdownii (Camperdown E)
parvifolia (Chinese E)
procera (English E)
pumila (Dwarf Asiatic E)

Zelkova

carpinifolia (*ulmoides*)
serrata
sinica
Verschaffeltii

Moraceae (Mulberry Family) 64

Broussonetia d

papyrifera (Paper Mulberry)

Cudrania d

tricuspidata

Maclura d

pomifera (Osage-Orange)

Morus

rubra (Red Mulberry)

alba (White Mulberry)
var pendula
australis (*acidosa*) d
microphylla

Trochodendraceae (Trochodendron Family) 90

Euptelea

Franchetii
polyandra

AMERICA OLD WORLD

Cercidiphyllaceae (Cercidiphyllum Family) 90a

Cercidiphyllum

japonicum d
var sinense

Magnoliaceae (Magnolia Family) 95

Liriodendron

Tulipifera (Tulip-Tree) chinense
var fastigiatum (*pyramidale*)

Magnolia

Flowering after or with leaves

acuminata (Cucumber-Tree) Sieboldii (*parviflora*)
grandiflora (Bull Bay) h
Fraseri
macrophylla (Large-leaved M)
tripetala
virginiana (*glauca*, Sweet Bay)

Flowering before leaves

denudata (Yulan M)
liliflora
var nigra
Kobus
var borealis
salicifolia
stellata (Star M)

Hybrids

x Soulangeana (denudata x liliflora)
x var Lennei

Annonaceae (Custard-Apple Family) 98

Asimina

triloba (Northern Papaw)

AMERICA OLD WORLD

Lauraceae (Laurel Family) 102

Sassafras

officinale (*variifolium, albidum*) d

Hamamelidaceae (Witch-Hazel Family) 123

Hamamelis

virginiana (Witch-Hazel)

japonica arborea (Japanese Witch-Hazel)
mollis (Chinese W)

Parrotia

persica

Parrotiopsis

Jacquemontiana h

Liquidambar

Styraciflua (Sweet-Gum)

formosana h
orientalis h

Sinowilsonia

Henryi

Eucommiaceae (Eucommia Family) 123b

Eucommia

ulmoides d

Platanaceae (Plane Tree Family) 124

Platanus

occidentalis (Plane Tree, Buttonwood)

orientalis (Oriental P)
Hybrid
x acerifolia (London P)
(occidentalis x orientalis)

AMERICA OLD WORLD

Pomaceae (Apple Family) 126a

Amelanchier

canadensis (Shadbush)
laevis
asiatica

Crataegus

coccinea (*intricata*)
coccinioides
crus-galli (Cockspur Thorn)
durobrivensis
mollis
nitida
Phaenopyrum (*cordata,* Washington Thorn)

Hybrids

x Lavallei (?crus-galli x pubescens)
x persistens (?x crus-galli)

monogyna
Oxyacantha (English Hawthorn)
var Pauli
var plena
var punicea
pinnatifida

Chaenomeles

sinensis

Cydonia

oblonga (Quince)

Malus

coronaria
glaucescens
ioensis (Prairie Crab-Apple)
var plena (Bechtel's Crab)

Hybrids

x arnoldiana (floribunda x baccata)
x atrosanguinea (Halliana x Sieboldii) (Carmine Crab A)
x brevipes
x Dawsoniana (fusca x pumila)
x Hopa (baccata x pumila var Niedzwetzkyana)

baccata (Siberian Crab)
var mandshurica
var gracilis
florentina
floribunda
Halliana var Parkmanii
hupehensis (*theifera*)
prunifolia
var Rinki fastigiata
Prattii
pumila (Common Apple)
var Niedzwetskyana
sikkimensis
Sieboldii var arborescens

America	Old World
x micromalus (spectabilis x baccata)	spectabilis
	var Riversii
x purpurea (pumila var Niedzwetzkyana x atrosanguinea)	toringoides
var Eleyi	Tschonoskii
x Scheideckeri (floribunda x prunifolia)	

Mespilus

germanica (Medlar)

Photinia

villosa

Pyrus

communis (Pear)
pyrifolia (*serotina,* Sand Pear)
ussuriensis

Sorbus

Leaves compound

americana (American Mountain-Ash)	aucuparia (Rowan-Tree)
	commixta
Hybrid	discolor
	pohuashanensis
x hybrida (aucuparia x intermedia)	Vilmorinii

Leaves simple

Hybrid	Aria (White Beam-Tree)
	intermedia
x latifolia (Aria x torminalis)	japonica
	torminalis (Wild Service-Tree)

Drupaceae (Plum Family) 126b

Prunus

Plums

americana (Wild Plum)	cerasifera
angustifolia	domestica (*communis,* European Plum)
hortulana	Simonii
lanata	
nigra (Canada P)	

America	Old World

Apricots

Armeniaca (Apricot)
Mume (Japanese A)
sibirica

Peaches

Davidiana (Chinese Peach)
Persica (Peach)

Cherries

Flowers solitary or in short cluster

pennsylvanica (Pin Cherry)

avium (Sweet Cherry)
var flora pleno
var Schnee
Cerasus (Sour C)
Conradinae
Mahaleb
Maximowiczii
pilosiuscula
serrulata (Japanese Flowering C)
(varieties are given below, p. 25)
Sieboldii (Taka-sago)
subhirtella
(varieties are given below, p. 25)
triloba (Flowering Almond)
yedoensis (Yoshino)

Flowers many in raceme

serotina (Black C)
virginiana (Choke C)

Maackii
Padus (European Bird C)

JAPANESE FLOWERING CHERRIES

By George M. Reed

Japan is rightly called "Cherry Land." Besides the many wild cherries growing in the mountain forests, the Japanese, from ancient times, have cultivated the cherries and produced hundreds of varieties, some with single and others with double flowers. Many places in Japan are famous for their beauty in "Cherry Time." During the last one hundred years varieties have been sent to other lands. Our National Capital is noted for its collection, presented in 1912 by the Mayor of Tokyo; and the glory of the Brooklyn Botanic Garden is "Cherry Walk" in late April or early May, when the pink double-flowered Kwanzan is in bloom.

In the spring of 1941, 76 trees of the variety Kwanzan, arranged in two double rows on the Esplanade, were set out and in the coming years will add to the attractiveness of the Garden.

The flowering cherries may be expected to do well wherever the peach can be grown successfully. They are adapted to various situations in ornamental plantings. Although they do not require excessive moisture, as do the willows, they make a fine display when planted in a setting along the banks of a stream or pond. Individual specimens on a lawn must have ample space for development. For such locations Kwanzan, with its large double pink flowers, Shirotae, with its pink buds and white flowers, and the Weeping Cherry, Shidare-higan, are very suitable. The fastigiate, or columnar, Ama-no-gawa, with semi-double light pink flowers, is effective in a formal planting.

In addition to the variety Kwanzan on Cherry Walk and the Esplanade, additional varieties of Flowering Cherries are planted nearby.

Varieties of Prunus serrulata

Ama-no-gawa (Milky Way)
Fastigiate form. Pale pink double flowers.

Fugenzo (Goddess on a White Elephant)
Large tree. Pink double flowers. Late.

Gijo-zakura (Dancing-girl Cherry)
Rather small tree. Flower buds deep pink; open flowers nearly white, semi-double.

Hata-zakura
Medium sized tree. White single flowers.

Kuruma-yama (A Japanese Mountain)
Small tree. Pale pink, rather small double flowers.

Kwanzan (A Japanese Mountain)
Large tree. The best double-flowered pink. Late flowering.

Meigetsu (Full Moon)
Medium sized tree. White single flowers.

Ojochin (Large Lantern)
Medium sized tree. Large white single flowers.

Shirotae (Snow White)
Large tree. Pink buds, white flowers. The best double-flowered white. Early.

Shiro-fugen (White Goddess)
Large tree. Buds pale pink, fading to white; double.

Shogetsu (Moon Hanging Low By a Pine Tree)
Small tree. Large white double flowers. Late.

Taizan-fukun (God of Taizan Mountain)
Small tree. Pale pink double flowers.

Taki-nioi (Fragrant Cascade)
Small tree. Pure white single fragrant flowers.

Ukon (Yellowish)
Large tree. Greenish yellow double flowers.

Washi-no-o (Eagle's Tail)
Small tree. Large single white flowers.

Varieties of Prunus subhirtella

Beni-higan (Pink Equinox)
Medium sized tree. Pink single flowers. Early.

Shidare-higan (Pendulous Equinox)
A weeping cherry. Pale pink single flowers.

Jugatsu-zakura (October Bloomer)
Small tree. Rather small, pale pink single to semi-double flowers, produced in the fall as well as in the spring.

AMERICA OLD WORLD

Mimosaceae (Mimosa Family) 127a

Albizzia

Julibrissin

Caesalpiniaceae (Senna Family) 127b

Cercis

canadensis (Redbud) chinensis (Chinese R)
Siliquastrum
var alba

Gleditsia

aquatica japonica
triacanthos (Honey Locust) sinensis
var inermis

Gymnocladus

dioicus (Kentucky Coffee-Tree) (chinensis, wanted)

Leguminosae (Pea Family) 128

Caragana

arborescens (Siberian Pea-Tree)

Cladrastis

lutea (Yellow-Wood) platycarpa

Laburnum

alpinum (Golden-Chain) h
var pendulum

Maackia

amurensis

Robinia

Pseudoacacia (Common Locust)
var Decaisneana
viscosa (Clammy L)

AMERICA OLD WORLD

Sophora

japonica (Japanese Pagoda-Tree)
var pendula

Rutaceae (Rue Family) 137

Evodia

Daniellii
hupehensis

Phellodendron d

amurense (Amur Cork-Tree)
chinense
japonicum
Lavallei
sachalinense

Ptelea

trifoliata (Hop-Tree)

Zanthoxylum

americanum (Prickly-Ash) d simulans (*Bungei*) h

Simaroubaceae (Quassia Family) 138

Ailanthus

Giraldii
glandulosa (*altissima*, Tree-of-Heaven)

Picrasma

quassioides

Meliaceae (Mahogany Tree Family) 140

Cedrela

sinensis

America	Old World

Euphorbiaceae (Spurge Family) 147

Sapium

	sebiferum (Chinese Tallow-Tree) h

Anacardiaceae (Cashew Family) 153

Cotinus d

americanus (American Smoke-Tree)	The Old World species is a large shrub

Rhus

copallina (Dwarf Sumac)	chinensis (*javanica*)
typhina (Staghorn S)	Potanini
Vernix (Poison S)	punjabensis var sinica
	sylvestris
	trichocarpa
	verniciflua (Varnish-Tree)

Aquifoliaceae (Holly Family) 157

Ilex

dubia (*monticola*) d	Aquifolium (English Holly) h
opaca (American Holly)	dipyrena
	macrocarpa

Celastraceae (Bitter Sweet Family) 158

Euonymus

atropurpurea	Bungeana
	europaea (Spindle-Tree)
	japonica
	lanceifolia
	latifolia
	Maackii
	oxyphylla

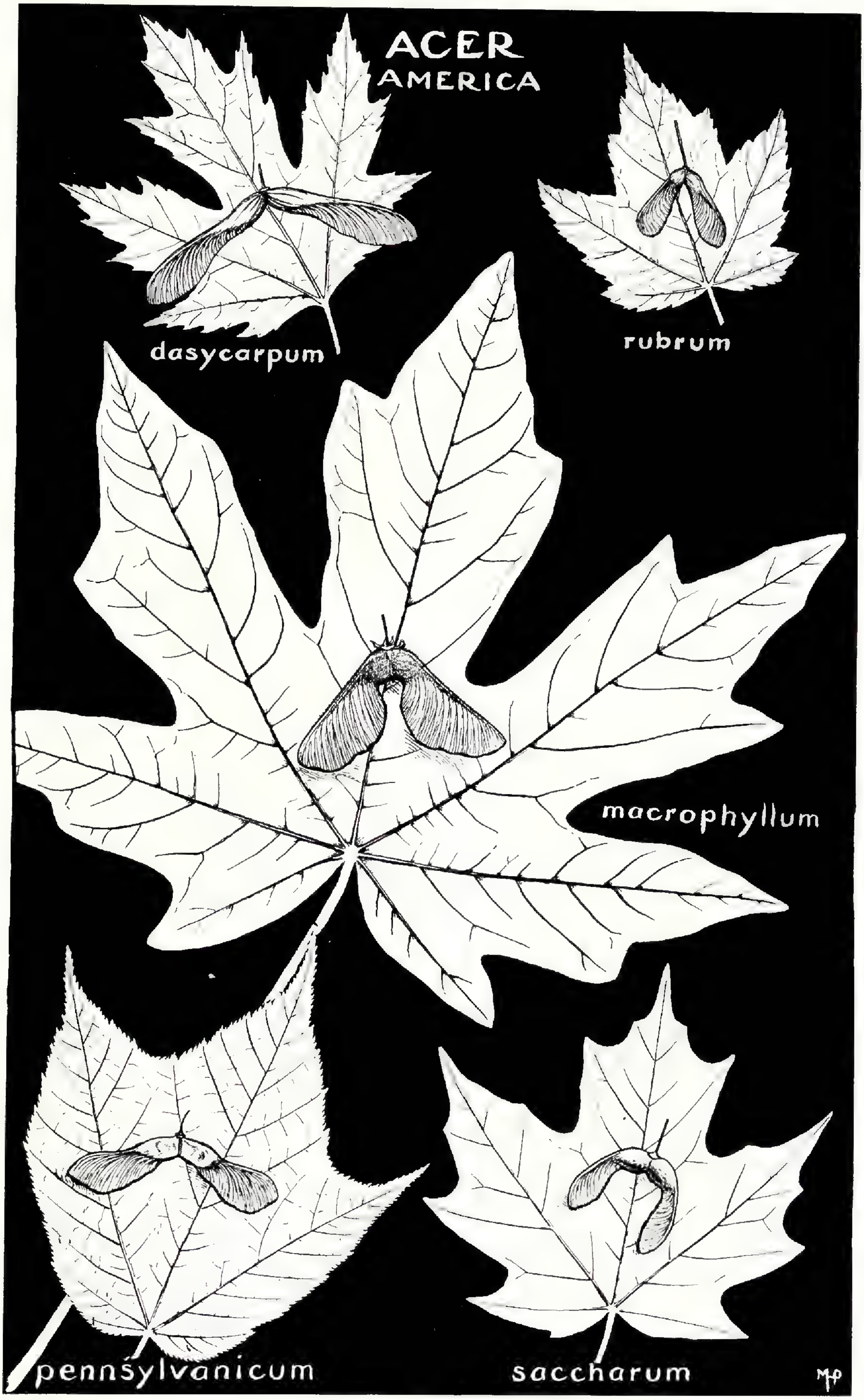


FIG. 7. Acer—American Maples. One-half natural size.

Maples (Figures 7–9)

More than 100 species of maples are known in the world, with the centers of distribution chiefly in Central and Eastern Asia, Eastern and Western United States and in Europe. Thus the "maple belt" extends with fair regularity around the whole northern hemisphere.

With their mostly palmately lobed leaves (not *pinnately* lobed as in the oaks), and their double, winged fruit (*schizocarp*), the maples are a remarkably distinct genus, botanically. There is only one other genus in the world with similar botanical characters, *Dipteronia*, which, with *Acer*, forms the maple family. *Dipteronia* in several respects suggests *Pterocarya* in the walnut family. The pinnately leaved maples, including the boxelder (*Acer Negundo*), form a transition between *Dipteronia* and the maples proper.

The chief importance of the maple lies in its use, horticulturally, as a shade and ornamental tree for city streets, parks, and private grounds. Not only the stately form of the tree, but also the brilliant autumnal coloration of most species, the attractive colors of the flowers and fruits of many kinds, as well as its ready acceptance of soil conditions, make it an ideal subject for ornamental planting.

In no other country in the world is the autumn coloration of the foliage so brilliant and so varied as in the northeastern United States. It is said that "not a few travellers from Europe time their visits to the United States so that they can witness the spectacle of the color splashed hillsides." For this annual spectacle the maples as well as the oaks are largely responsible; and the chief color bearers among the maples are the sugar maple and the red maple. The predominant color of the sugar maple is a rich golden yellow, but many of its outer leaves are often tinged with a glorious crimson. The red or swamp maples are also brilliant, but their color combinations are not as varied, nor so satisfying.

In addition to their ornamental value, several kinds of maples are important timber trees; and some, particularly the sugar maple, yield a syrup and a sugar of a characteristic and remarkably delicious flavor.

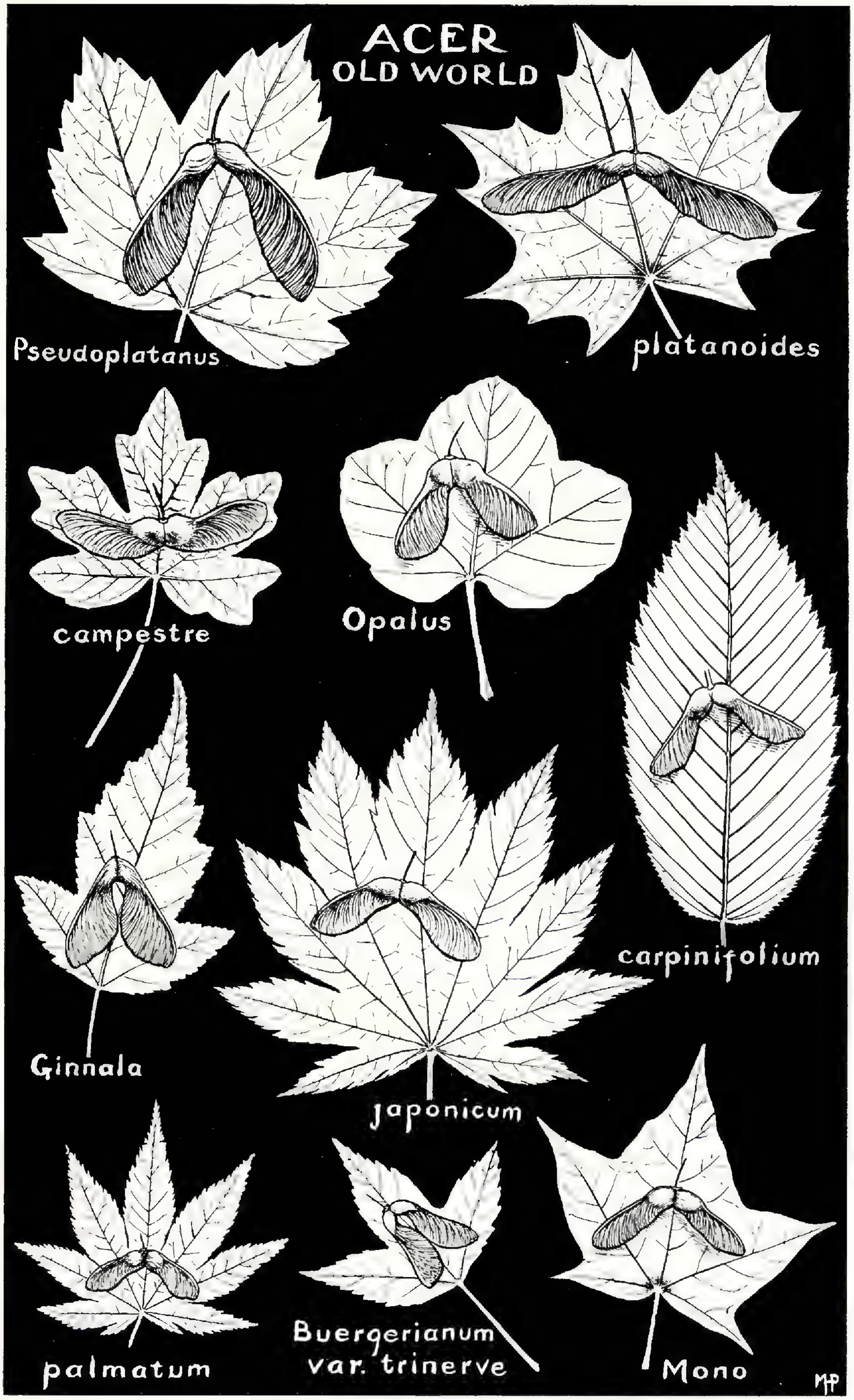


FIG. 8. Acer—Old World Maples. One-half natural size.

AMERICA OLD WORLD

Aceraceae (Maple Family) 163

Acer

Leaves simple, flowers terminal on leafy branchlets

macrophyllum
pennsylvanicum (*striatum*, Striped Maple, Moosewood)
saccharum (Sugar M)
  var Schneckii (Western S. M)
spicatum (Mountain M)

argutum
Buergerianum
campestre (English Field M)
cappadocicum
capillipes
carpinifolium (Hornbeam M)
Davidi
distylum
Ginnala
glabrum
Heldreichii
japonicum
  var aconitifolium
Miyabei
Mono (*pictum*)
Opalus (Italian M)
palmatum (Japanese M)
platanoides (Norway M)
  var columnare
  var palmatifidum
  var Schwedleri
Pseudoplatanus (Sycamore M)
rufinerve
Sieboldianum
tataricum
triflorum
truncatum

Leaves simple, flowers on lateral leafless branchlets

dasycarpum (*saccharinum*, Silver M)
  var pyramidale
  var Wieri
rubrum (Red M)
  var columnare

diabolicum

Leaves compound (Boxelder Group)

Negundo (Box-Elder)

cissifolium
griseum
nikoense

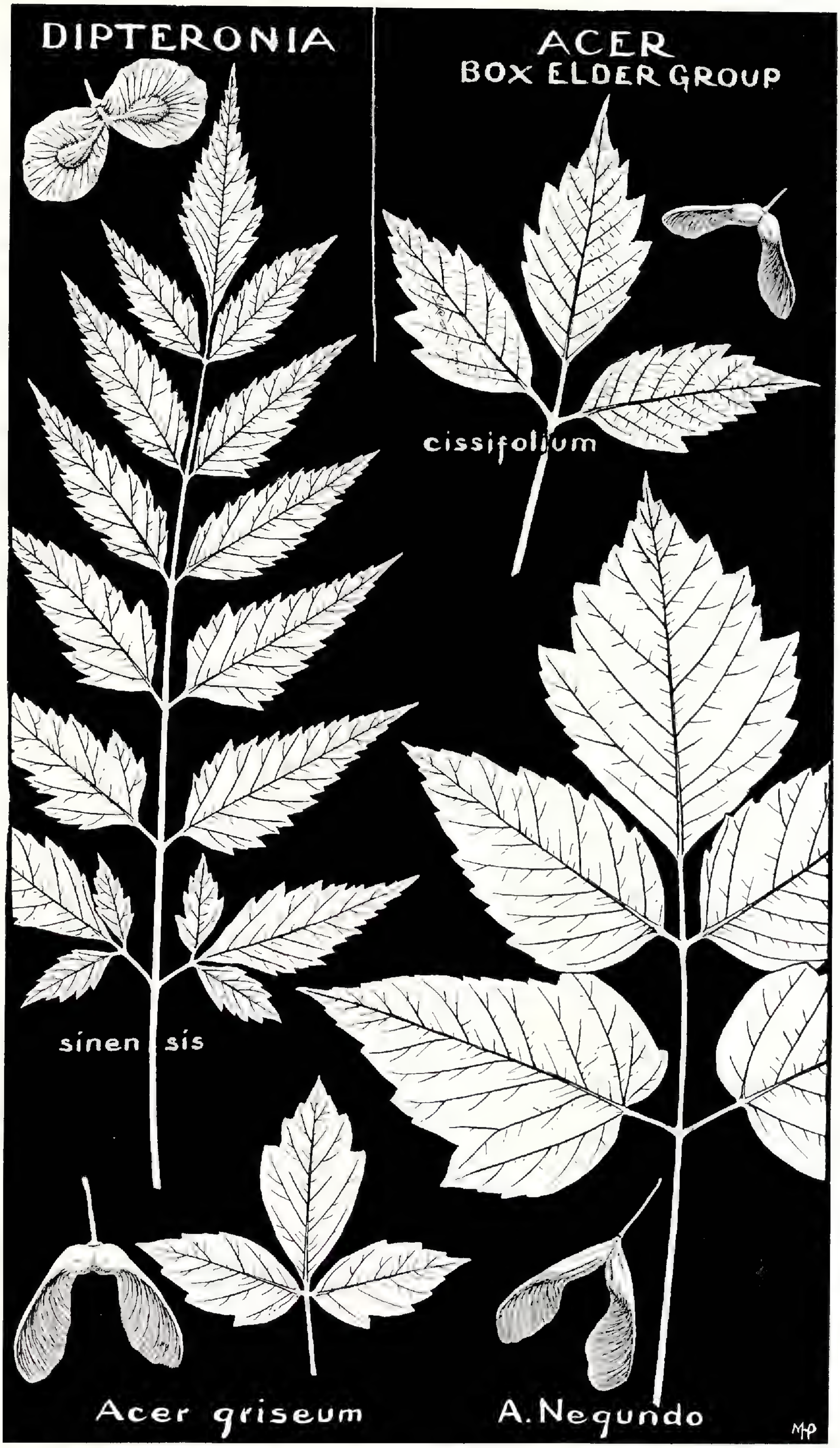


FIG. 9. Dipteronia and Acer (Compound-leaved Maples). One-half natural size.

AMERICA OLD WORLD

Dipteronia

sinensis

Hippocastanaceae (Horsechestnut Family) 164

Aesculus

glabra (Ohio Buckeye)
octandra (Sweet B)
Pavia

Hybrid

x carnea (Red H) (Hippocastanum x Pavia)

Hippocastanum (Horsechestnut)
var Baumannii
var pyramidalis
turbinata (Japanese H)

Sapindaceae (Soapberry Family) 165

Koelreuteria

paniculata (Goldenrain-Tree)

Xanthoceras

sorbifolia

Sapindus

Drummondii h

Rhamnaceae (Buckthorn Family) 169

Hovenia

dulcis (Japanese Raisin-Tree) h

Rhamnus

caroliniana
Purshiana

cathartica (European Buckthorn) d
davurica

Frangula

Zizyphus

Jujuba (Common Jujube)

AMERICA OLD WORLD

Tiliaceae (Linden Family) 174

Tilia

americana (Basswood)
heterophylla (White L)
neglecta (Gray L)

Hybrids

x euchlora (cordata x dasystyla)
x europaea (vulgaris) (cordata x platyphyllos)
x Moltkei (americana x petiolaris)

amurensis
cordata (Small-leaved Linden)
dasystyla (Caucasus L)
Oliveri
platyphyllos (Large-leaved L)
tomentosa (Silver L)

Sterculiaceae (Sterculia Family) 178

Firmiana

simplex (*Sterculia platanifolia*, Parasol-Tree) h

Theaceae (Tea Family) 186

Franklinia (*Gordonia*)

altamaha
Known now only in cultivation

Stewartia

koreana
pseudocamellia

Flacourtiaceae (Flacourtia Family) 199

Idesia

polycarpa h d

Elaeagnaceae (Oleaster Family) 215

Elaeagnus

angustifolia (Oleaster)

Hippophae

rhamnoides (Sea-Buckthorn) d

AMERICA OLD WORLD

Nyssaceae (Tupelo Family) 220a

Davidia

involucrata h
var Vilmoriniana

Nyssa

sylvatica (Tupelo) sinensis

Araliaceae (Ginseng Family) 227

Kalopanax

pictus (*Acanthopanax ricinifolius*)

Aralia

spinosa (Hercules Club)

Cornaceae (Dogwood Family) 229

Cornus

Flowers without involucre

alternifolia (Alternate-Leaved Dogwood)
controversa
macrophylla
Walteri

Flowers with involucre

florida (Flowering D)
var rubra (Pink D)
kousa (Japanese D)
mas (Cornelian-Cherry)
officinalis

Clethraceae (Clethra Family) 230

Clethra

(acuminata, wanted)
barbinervis

Ericaceae (Heath Family) 233

Oxydendrum

arboreum (Sourwood)

AMERICA OLD WORLD

Rhododendron

maximum Smirnowi

Sapotaceae (Sapota Family) 239

Bumelia

lanuginosa (Chittimwood)
lycioides

Ebenaceae (Persimmon Family) 240

Diospyros d

virginiana (Persimmon) lotus
var Josephine

Styracaceae (Storax Family) 242

Halesia

carolina (Silverbell-Tree) (Macgregorii, wanted)
diptera
monticola

Pterostyrax

hispida (Epaulette-Tree)

Styrax

americana dasyantha
japonica (Storax)
Obassia

Oleaceae (Olive Family) 243

Chionanthus d

virginicus (Fringe-Tree) retusus

Fraxinus

Flower clusters terminal on leafy shoots

cuspidata chinensis
longicuspis
Ornus (Flowering Ash)
Paxiana

AMERICA OLD WORLD

Flowers from axillary buds, calyx on fruit

americana (American Ash) xanthoxyloides
pennsylvanica (Red A)
var lanceolata (Green A)

Flowers from axillary buds, calyx none

nigra (Black A) excelsior (European Ash)
quadrangulata (Blue A) var diversifolia
holotricha

Syringa

amurensis var japonica (Tree Lilac)

Boraginaceae (Borage Family) 252

Ehretia

thyrsiflora

Scrophulariaceae (Figwort Family) 257

Paulownia

tomentosa (Empress-Tree)

Bignoniaceae (Bignonia Family) 258

Catalpa

bignonioides (Common Catalpa) ovata (Chinese C)
speciosa (Western C)

Caprifoliaceae (Honeysuckle Family) 271

Sambucus

American species are shrubs nigra (European Elder)

Viburnum

Lentago (Nannyberry) Lantana (Wayfaring-Tree)
prunifolium (Black-Haw) Sieboldii

UNUSUAL TREES IN THE BROOKLYN BOTANIC GARDEN

By Charles F. Doney

Among some 600 kinds of trees growing in the Brooklyn Botanic Garden the following 38 are worthy of special mention for their ornamental value, their survival here near the limit of their range of hardiness, their rarity, or for other reasons.

Salix Matsudana var. *tortuosa.* Willow Family. P. 8. An attractive tree of good habit, whose slender, upright branches are curiously twisted; particularly interesting after the leaves have dropped.

Platycarya strobilacea. Walnut Family. P. 9. Though of no particular ornamental value, this small tree is interesting because of its fruits. It resembles the other members of the family in general characteristics, but is unusual in bearing its small nutlets in a short, cone-like catkin. China.

Pterocarya stenoptera. Wing Nut. Walnut Family. P. 9. A handsome, rapidly growing tree, with either a short trunk or many branches from the ground. The small winged nuts are borne in pendulous racemes, often over 12 inches in length. China.

Betula davurica. Birch Family. P. 9. This birch has attractive, glossy foliage. Its slender branches and peeling brown bark make it picturesque also in the winter. N. E. Asia, Japan.

Betula Maximowicziana. Birch Family. P. 9. A handsome large tree, with dull orange or gray bark, its large leaves, sometimes to 6 inches in length, make it outstanding among the birches. Japan.

Corylus Colurna. Turkish Hazel. Birch Family. P. 12. One of the few arborescent hazels. A robust tree with attractive foliage, cultivated for centuries. The nuts are not freely produced. S. E. Europe, W. Asia.

Quercus dentata. Beech Family. P. 16. An Asiatic oak with stout hairy branches. The wavy-toothed leathery leaves are unusually large, at times exceeding 8 inches in length; they turn brown early in the fall. Japan, China.

Ulmus carpinifolia var. *Koopmannii.* Elm Family. P. 18. The Smooth Leaved Elm is a tall tree with straight trunk. The variety

Koopmannii, however, has a very short trunk and many upright branches forming a dense oval head.

Zelkova serrata. Elm Family. P. 18. An uncommon tree, with leaves resembling those of the elm. It is the "Keaki" of Japan, whose wood is highly valued as a building material. Japan.

Euptelea polyandra. Trochodendron Family. P. 18. Small tree or large shrub. The flowers, which appear along the branches before the leaves unfold, have no petals but are attractive because of the clusters of orange or red stamens. Grown more for botanical interest than ornamental value. Japan.

Cercidiphyllum japonicum. Katsura-Tree. Cercidiphyllum Family. P. 19. A handsome tree, usually with a short trunk and many upright branches. The leaves are red when developing in the spring, and when fully grown they resemble the foliage of *Cercis,* our native red-bud. Japan.

Liriodendron chinense. Magnolia Family. P. 19. This Asiatic species differs from the American one in that it has more deeply lobed leaves and smaller flowers. China.

Parrotia persica. Witch-Hazel Family. P. 20. A small tree with densely growing branches. The flowers open early in the spring and have attractive red stamens. Persia.

Parrotiopsis Jacquemontiana. Witch-Hazel Family. P. 20. The flowers of this small tree have white bracts and suggest flowering dogwood. Himalayas.

Eucommia ulmoides. Chinese Rubber Tree. Eucommia Family. P. 20. A handsome tree with gray bark and glossy dark leaves; it contains a rubber-like substance. China.

Chaenomeles sinensis. Chinese Quince. Apple Family. P. 21. Closely related to the cultivated quince, this species is a small tree with pink flowers and foliage that colors brightly in the fall. The large oval fruit is fragrant but woody. China.

Mespilus germanica. Medlar. Apple Family. P. 22. Long cultivated for its fruits. It is a coarse tree with solitary white flowers and small hard fruits that are palatable only after they have begun to decay. Europe, Asia Minor.

Sorbus Aria. White Beam-Tree. Apple Family. P. 22. A beautiful tree whose bright green, simple leaves are white on the

under surface. The white flowers are followed by bright red berries. There are many garden forms. Europe.

Sorbus commixta. Apple Family. P. 22. An oriental cousin of our native Mountain Ash, which it closely resembles. The pinnate leaves color brightly in the fall and remain on the tree for some time. Korea, Japan.

Albizzia julibrissin. Silk Tree. Mimosa Family. P. 26. A small spreading tree with handsome, doubly pinnate foliage. The individual flowers are small, but they have long silky stamens and are borne in compact, tassel-like clusters. The color varies from pale pink to deep pink and the flowers are produced over a long period in summer. Persia to central China.

Maackia amurensis. Pea Family. P. 26. One of the few trees that bloom in July. The upright clusters of fragrant white flowers are not particularly handsome, but they are freely produced and a tree in full bloom is attractive. Japan.

Evodia hupehensis. Rue Family. P. 27. A small tree with much character. In habit it is more or less round-topped, with pinnate leaves and flat clusters of inconspicuous flowers. The foliage remains green until late in the fall, which would make it a good street tree. Makes an interesting lawn specimen. China.

Poncirus trifoliata. Trifoliate Orange. Rue Family. P. 27. The hardiest member of the orange group. In May the white flowers open before the leaves, on flattened or twisted green branches. The ornamental fruits ripen in the fall; they are bitter and have little pulp. The Trifoliate Orange is used as an understock in grafting citrous fruits. Because of its strong sharp spines it is sometimes used as a hedge plant in milder climates. Northern China, Korea.

Picrasma quassioides. Quassia Family. P. 27. Though closely related to *Ailanthus* it is more refined and has no troublesome traits. A small tree with glossy dark green leaves and long slender branches that at first are ascending but later tend to droop, somewhat like pin oak. Bark very bitter; flowers inconspicuous. China, Japan.

Rhus verniciflua. Lacquer Tree. Cashew Family. P. 28. A stout-branched tree with large pinnate leaves. The tiny flowers are borne in large showy clusters, and the yellow pea-like fruits in

pendent clusters are interesting in the fall. Japanese lacquer is obtained from this tree. One of the poisonous sumacs. China, Japan.

Acer griseum. Paperbark Maple. Maple Family. P. 32. One of the Boxelder group of Maples. It is outstanding because of the thin, papery bark which peels off and exposes the smooth orange-brown inner bark. W. China.

Acer Opalus. Italian Maple. Maple Family. P. 32. A small, somewhat shrubby but very attractive tree. The leaves resemble those of the English Field Maple. It holds its leaves very late in the fall. S. Europe.

Dipteronia sinensis. Maple Family. P. 34. *Dipteronia* is the only genus besides Maple in this Family. It is an interesting and very rare small tree, with ornamental, pinnate leaves. The flowers and fruits are of no decorative value. Though classed as a tree it has with us a shrubby tendency. China.

Idesia polycarpa. Flacourtia Family. P. 35. If this tree were hardier it might be a popular ornamental, for the long clusters of red fruit are attractive. The yellow, apetalous flowers are of only passing interest, but the heart-shaped leaves are effective all summer. Staminate and pistillate flowers are borne on separate trees. The staminate tree in the Brooklyn Botanic Garden did not survive the hard winter of 1934; the pistillate tree was only slightly injured. China, Japan.

Davidia involucrata var *Vilmoriniana*. Dove Tree. Tupelo Family. P. 36. A tree with attractive foliage. The tiny flowers with prominent stamens are borne in compact heads with two conspicuous white bracts of unequal length at the base of the head. Trees in certain places are said to be spectacular when in full bloom, but here it has been of little ornamental value. Illustration on front cover page. China.

Kalopanax pictus. (*Acanthopanax ricinifolius*.) Ginseng Family. P. 36. Somewhat unique is this large tree with its palmate leaves resembling those of the Castor-oil plant, and stout branches covered with strong prickles. The large clusters of white flowers, sometimes 12 inches across, are attractive, and are followed by shiny black fruits. Hardy north of Brooklyn. China, Japan.

Cornus controversa. Dogwood Family. P. 36. This species and the American *Cornus alternifolia* are the only dogwoods with alternate leaves. Its wide-spreading, horizontal branches are produced in tiers. Because of its interesting way of branching, its good foliage and white flowers in May it makes a good lawn specimen. China, Japan.

Cornus macrophylla. Dogwood Family. P. 36. A small tree, somewhat like *Cornus controversa.* The long-pointed leaves are large, often exceeding seven inches in length, and in late June the tree is very attractive with its broad clusters of white flowers. China, Japan, Himalayas.

Cornus Walteri. Dogwood Family. P. 36. Though quite different in habit and not so handsome as the preceding species, it is nevertheless an interesting and worth while small tree. China.

Oxydendrum arboreum. Sorrel-Tree or Sourwood. Heath Family. P. 36. Another tree that blooms in mid-summer. In July the small white flowers are carried in drooping branched clusters. The foliage of this slender tree, which reaches its best development in the mountains of Tennessee, is dark glossy green and in the fall becomes brightly colored. A handsome small tree that deserves wider appreciation. Being a member of the Heath Family it requires a lime-free soil. Much planted along the Hutchinson River Parkway, Westchester County, N. Y. Pennsylvania to Louisiana.

Pterostyrax corymbosa. Epaulette Tree. Storax Family. P. 37. A vigorous tree with rather coarse, light green foliage. The white flowers are so arranged in the pendulous clusters that they resemble a series of epaulettes. Japan.

Ehretia thyrsiflora. Borage Family. P. 38. *Ehretia* has small white flowers and coarse foliage. It is grown here mainly for botanical interest, for it is the only member of the Family to become a tree in this climate. China, Japan.

Catalpa Fargesi. Bignonia Family. P. 38. In its native habitat this Catalpa is a tall tree. In Brooklyn it is more or less shrubby, and so far has not produced its flowers, which are unusual in being pink. China.

MEMORIAL AND GIFT TREES

By C. Stuart Gager

"From time to time, since it was established, the Botanic Garden has been offered gifts of money to be used for planting a tree or providing some other object to be prominently placed and designated by a bronze tablet or other suitable marker as a memorial to someone related to or greatly admired by the would-be donor, but concerning whom the proposed memorial would be the first intimation to the general public that such a person had existed. City authorities have had such proposals with reference to public squares and parks. The motive of the donor is of the highest, but it requires only a brief consideration to make clear the impropriety of placing such marked memorials in public places. After a thorough consideration of this matter, the Botanic Garden Governing Committee, some time ago, adopted the following resolution:

"Resolved, that no memorial inscriptions should be permitted within the Botanic Garden other than to those whose life and whose scientific, educational, or civic activities have been such as to entitle them to commemoration in public places." (*19th Annual Report of Brooklyn Botanic Garden. 1929.*)

Services to botanical science and in particular to the Brooklyn Botanic Garden may be recognized by suitable inscriptions on approval of the Botanic Garden authorities.

Of course when trees are presented to the Botanic Garden the name of the donor is designated on the label, just as the names of donors are acknowledged on the labels of gifts exhibited by museums.

The grounds have now become so completely planted with trees and shrubs that there are no longer available any unoccupied locations for memorial or gift trees, and the following plan was adopted nearly ten years ago. One wishing to present a tree may select any unassigned tree on the grounds and by payment of Fifty Dollars, may qualify as the donor of the tree, and may be so designated on the label. The donor thus has the advantage of securing a tree that has become well established, avoiding the risk of success with a newly planted young tree. The donor—an individual or an organization—may, if he wishes, designate the tree

as a memorial to any person (e.g., Linnaeus) not already commemorated in the Garden and within the limitations indicated above. This plan became effective in 1932. Part of the payment is used to provide a suitable label, the remainder to enrich the collection of living plants. As will be seen from the following list, several trees have been thus endowed.

It is our hope to have all the Schwedler Maples on the Esplanade endowed in this way. Five have been so designated. A total of nineteen trees have been presented to date, as follows, in chronological order.

List of Memorial and Gift Trees

Sweet Gum (*Liquidambar Styraciflua*)

Planted September 12, 1912, by Prof. Hugo de Vries, the great Dutch botanist, author of the mutation theory of evolution, one of the founders of modern plant physiology, director of the Hortus Botanicus, Amsterdam. At the time of his death he was considered by many as the greatest living botanist. Local Flora Section.

Tulip Tree (*Liriodendron Tulipifera*)

Planted October 16, 1913, by Prof. Adolf Engler, director of the Botanical Garden and Museum at Berlin, and co-author of the Engler and Prantl system of plant classification. The Systematic Section of the Brooklyn Botanic Garden is arranged according to a modification of this system. Local Flora Section.

White Oak (*Quercus alba*)

Planted May 9, 1916, by Mr. Alfred T. White, at the Second Annual Spring Inspection of the Garden. At the time of his death, January 29, 1921, Mr. White was generally considered as the leading citizen of Brooklyn. He was the "father" of the Brooklyn Botanic Garden and its greatest benefactor. Donor of the Japanese Garden, the Conservatory Plaza Lily Pools, and one-third the cost of the completion of the buildings; underwriter of research in plant pathology. White Oak Circle, Systematic Section.

Pin Oak (*Quercus palustris*)
Planted May 9, 1916, by Miss Frances E. White, eldest sister of Mr. Alfred T. White. Her generosity helped to make the Brooklyn Botanic Garden possible. One of the greatest benefactors of the Garden. The tree is located north of the Local Flora Section.

Red Oak (*Quercus rubra*)
Planted May 9, 1916, by Miss Harriet H. White, sister of Mr. Alfred T. White. Her generosity helped to make the Brooklyn Botanic Garden possible. One of the greatest benefactors of the Garden. The tree is located north of the Local Flora Section.

Black Oak (*Quercus velutina*)
Planted May 9, 1916, by Mr. A. Augustus Healy, President of the Board of Trustees when the Brooklyn Botanic Garden was established, a member *ex officio* of the first Botanic Garden Governing Committee, and one of the large benefactors of the Garden. The tree is north of the Local Flora Section.

Silver Linden (*Tilia tomentosa*)
Planted October 25, 1923, by Ellen Eddy Shaw, first Curator of Elementary Instruction at the Botanic Garden. She organized and developed our extensive educational work with children and the teachers of children. Linden Triangle, near the south Washington Ave. gate and just north of the Children's Garden.

American Elm (*Ulmus americana*)
Planted April 24, 1925, by the Girl Scouts of Flatbush. Girl Scouts Triangle near south Flatbush Ave. entrance (Richard Young gate).

Red Flowered Horsechestnut (*Aesculus carnea*—Hybrid of *A. Hippocastanum* x *A. Pavia*)
Given in 1925 by Miss Isabelle R. Reynolds, Cambridge, Mass.

Pink Dogwood (*Cornus florida* var. *rubra*)
Planted May 6, 1931, by the Women of '76 Chapter, N.S.D.A.R. George Washington memorial tree. Located near the center of the Lilac Triangle.

CHESTNUT OAK (*Quercus heterophylla*)

Planted October 31, 1931, by the New York City Federation of Women's Clubs, Inc., in honor of George Washington. North end of the Local Flora Section.

SWAMP POST OAK; OVERCUP OAK (*Quercus lyrata*)

Endowed October 31, 1932, by the New York State Organization, National Society D.A.R. in honor of the State Regent, 1929–1932. Systematic Section.

ARMISTICE MAPLES (*Acer platanoides* var. *Schwedleri*)

The planting of two double rows of Schwedler maples on the Esplanade was completed in the fall of 1918, near the date of the Armistice (November 11), that terminated the World War of 1914–18. There are 20 trees in each row, and it is hoped that each of the eighty trees may ultimately be endowed. To date there are five, as follows:

By the Colonial Daughters of the 17th Century. January 14, 1933.

By Mrs. Walter V. Cranford. January 14, 1933.

By the Fort Green Chapter, N.S.D.A.R. May 2, 1933.

By the Battle Pass Chapter, N.S.D.A.R. October 25, 1934.

By the Women of '76 Chapter, N.S.D.A.R. June 17, 1936.

HORSECHESTNUT (*Aesculus Hippocastanum*)

Endowed May 14, 1935, by the Brooklyn Civic Council in honor of Hon. Lewis H. Pounds, President of the Borough of Brooklyn (1914–1917), State Treasurer of New York (1924–1926), founder (1923) and chairman of the Brooklyn Civic Council, in recognition of his extensive and valuable services to the State, the City, and the Brooklyn Botanic Garden. Systematic Section.

DOUBLE FLOWERED HORSECHESTNUT (*Aesculus Hippocastanum* var. *Baumanii*)

Endowed June 12, 1935, by the faculty and students of the Girls Commercial High School (Brooklyn), Miss Evelyn W. Allan, Principal, in commemoration of the Twenty-fifth Anniversary of the founding of the Brooklyn Botanic Garden. Systematic Section.

INDEX OF GENERA AND COMMON NAMES

Citations are to page numbers; for Latin names family numbers are added in parentheses

Abies (23) 2
Acer (163) 32
Aesculus (164) 34
Ailanthus (138) 27
Albizzia (127a) 26
Alder 9
Alnus (61) 9
Amelanchier (126a) 21
Aphananthe (63) 16
Apple 21
Apricot 23
Aralia (227) 36
Araucaria (22) 2
Arbor-Vitae 7
Ash 37
Asimina (98) 19
Aspen 8

Bald-Cypress 7
Balm-of-Gilead 8
Basswood 35
Beech 12
Betula (61) 9
Big Tree, See Sequoia 7
Birch 9
Bitternut 9
Black-Haw 38
Blue-Beech 12
Box-Elder 32
Broussonetia (64) 18
Buckeye 34
Buckthorn 34
Bull Bay 19
Bumelia (239) 37
Butternut 9
Buttonwood 20

Caragana (128) 26
Carpinus (61) 12
Carya (60) 9
Castanea (62) 12
Catalpa (258) 38
Cedar 3
Cedrela (140) 27
Cedrus (23) 3
Celtis (63) 16
Cephalotaxus (21) 2
Cercidiphyllum (90a) 19
Cercis (127b) 26
Chaenomeles (126a) 21
Chamaecyparis (25) 7
Cherry 23
Chestnut 12
Chinese Tallow-Tree 28
Chinquapin 12
Chionanthus (243) 37
Chittimwood 37
Cladrastis (128) 26
Clethra (230) 36
Cockspur Thorn 21
Cotinus (153) 28
Cork-Tree 27
Cornelian-Cherry 36
Cornus (229) 36
Corylus (61) 12
Cottonwood 8
Crab-Apple 21
Crataegus (126a) 21
Cryptomeria (24) 6
Cucumber-Tree 19
Cudrania (64) 18
Cupressus (25) 7
Cydonia (126a) 21
Cypress 7

Davidia (220a) 36
Diospyros (240) 37
Dipteronia (163) 34
Dogwood 36

Ehretia (252) 38
Elaeagnus (215) 35
Elder 38
Elm 18
Empress-Tree 38
Epaulette-Tree 37
Eucommia (123b) 20
Euonymus 28
Euptelea (90) 18
Evodia (137) 27

Fagus (62) 12
Fir 2
Firmiana (178) 35
Fitzroya (25) 7
Flowering Almond 23
Franklinia (186) 35
Fraxinus (243) 37
Fringe-Tree 37

Ginkgo (20) 2
Gleditsia (127b) 26
Golden-Chain 26
Goldenrain-Tree 34
Gordonia (186) 35
Gymnocladus (127b) 26

Hackberry 16
Halesia (242) 37
Hamamelis (123) 20
Hawthorn 21
Hazelnut 12
Hemiptelea (63) 18
Hemlock 6
Hercules Club 36
Hickory 9
Hippophae (215) 35
Holly 28
Honey Locust 26
Hop-Hornbeam 12
Hop-Tree 27
Hornbeam 12
Horsechestnut 34
Hovenia (169) 34

Idesia (199) 35
Ilex (157) 28
Incense-Cedar 7

Japanese Pagoda-Tree 27
Japanese Raisin-Tree 34
Juglans (60) 9
Jujube 34
Juniper 7
Juniperus (25) 7

Kalopanax (227) 36
Kentucky Coffee-Tree 26
Koelreuteria (165) 34

Laburnum (128) 26
Larch 3
Larix (23) 3
Libocedrus (25) 7
Lilac, Tree 38
Linden 35
Liquidambar (123) 20
Liriodendron (95) 19
Locust 26

Maackia (128) 26
Maclura (64) 18
Magnolia (95) 19

Maidenhair-Tree 2
Malus (126a) 21
Maple 32
Medlar 22
Mespilus (126a) 22
Mockernut 9
Monkey Puzzle 2
Moosewood 32
Morus (64) 18
Mountain-Ash 22
Mulberry 18

Nannyberry 38
Nyssa (220a) 36

Oak 16
Oleaster 35
Osage-Orange 18
Ostrya (61) 12
Oxydendrum (233) 36

Papaw 19
Parasol-Tree 35
Parrotia (123) 20
Parrotiopsis (123) 20
Paulownia (257) 38
Peach 23
Pear 22
Pecan 9
Persimmon 37
Phellodendron (137) 27
Photinia (126a) 22
Picea (23) 3
Picrasma (138) 27
Pignut 9
Pine 3
Pinus (23) 3
Plane-Tree 20
Platanus (124) 20
Platycarya (60) 9
Plum 22
Poplar 8
Populus (56) 8
Prickly-Ash 27
Prunus (126b) 22
Pseudolarix (23) 6
Pseudotsuga (23) 6
Ptelea (137) 27
Pterocarya (60) 9
Pterostyrax (242) 37
Pyrus (126a) 22

Quercus (62) 16
Quince 21

Redbud 26
Red-Cedar 7
Rhamnus (169) 34
Rhododendron 37
Rhus (153) 28
Robinia (128) 26
Rowan-Tree 22

Salix (56) 8
Sambucus (271) 38
Sapindus (165) 34
Sapium (147) 28
Sassafras 20
Sciadopitys (24) 7
Sea-Buckthorn 35
Sequoiadendron (24) 7
Shadbush 21
Siberian Pea-Tree 26
Silverbell-Tree 37
Sinowilsonia (123) 20
Smoke-Tree 28
Sophora (128) 27
Sorbus (126a) 22
Sourwood 36
Spindle-Tree 28
Spruce 3
Stewartia (186) 35
Storax 37
Styrax (242) 37
Sumac 28
Sweet Bay 19
Sweet-Gum 20
Syringa (243) 38

Taxodium (24) 7
Taxus (21) 2
Thuja (25) 7
Thujopsis (25) 8
Tilia (174) 35
Torreya (21) 2
Tree-of-Heaven 27
Tsuga (23) 6
Tulip-Tree 19
Tupelo (220a) 36

Ulmus (63) 18
Umbrella-Pine 7

Varnish-Tree 28
Viburnum (271) 38

Walnut 9
Washington Thorn 21
Wayfaring-Tree 38
White Beam-Tree 22
Wild Service-Tree 22
Willow 8
Wingnut 9
Witch-Hazel 20

Xanthoceras (165) 34
Xanthoxylum, See Zanthoxylum

Yellow-Wood 26
Yew 2

Zanthoxylum (137) 27
Zelkova (63) 18
Zizyphus (169) 34

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical investigations.
3. Popular botanical publication.
4. The endowment of a lectureship, or a lecture course.
5. Botanical illustrations for publications and lectures.
6. The purchase and collecting of plants.
7. The beautifying of the grounds.
8. The purchase of publications for the library.
9. Extending and enriching our work of public education.
10. The establishing of prizes to be awarded by the Brooklyn Botanic Garden for botanical research, or for superior excellence of botanical work in the High Schools of the City of New York.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following eight classes of membership may be taken out through the Botanic Garden:

1.	Annual, by annual payment of	$ 10
2.	Sustaining, by annual payment of	25
3.	Contributing, by annual payment of ..	100
4.	Life, by one payment of	500
5.	Permanent, by one payment of	2,500
6.	Donor, by one payment of	10,000
7.	Patron, by one payment of	25,000
8.	Benefactor, by one payment of	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to eight carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members may also enjoy the privileges indicated on the following page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, Main 2-4433.

NOTE: *Contributions to the Brooklyn Botanic Garden, through membership dues or otherwise, constitute proper deductions under the Federal and New York State Income Tax Laws.*

PRIVILEGES OF MEMBERSHIP

1. Free admission to the buildings and grounds at all times.
2. Cards of admission for self and friends to all exhibitions and openings preceding the admission of the general public, and to receptions.
3. Services of docent (by appointment), for self and party (of not less than six), when visiting the Garden.
4. Admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Free tuition in most courses of instruction; in other courses a liberal discount from the fee charged to non-members.
6. Invitations for self and friends to spring and fall "Flower Days," and to the Annual Spring Inspection.
7. Copies of Garden publications, as follows:
   a. RECORD (including the ANNUAL REPORT).
   b. GUIDES (to the Plantations and Collections).
   c. LEAFLETS (of popular information).
   d. CONTRIBUTIONS (on request. Technical papers).
8. Announcement Cards (Post Card Bulletins) concerning plants in flower and other items of interest.
9. Privileges of the Library and of the Herbarium.
10. Expert advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, indoors and out; on planting the home grounds; the care of lawns; and the treatment of plants affected by insect and fungous pests.
11. Determination of botanical specimens.
12. Participation in the periodical distribution of surplus plant material and seeds, in accordance with special announcements sent to members from time to time.
13. Membership privileges in other botanic gardens and museums outside of Greater New York, when visiting other cities and on presentation of Brooklyn Botanic Garden membership card.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a camera with tripod are not allowed in the Japanese Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists, and the public in general, may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on congested paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 301, or by mail (1000 Washington Avenue), or by telephone (MAin 2–4433).

The Brooklyn Institute of Arts and Sciences

Officers of the Institute

Chairman, Board of Trustees
EDWARD C. BLUM

President
JAMES G. McDONALD, LL.D.

First Vice-President
WALTER H. CRITTENDEN

Second Vice-President
ADRIAN VAN SINDEREN

Third Vice-President
CHARLES PRATT

Treasurer
EDWIN P. MAYNARD

Secretary
FRANCIS T. CHRISTY

Botanic Garden Governing Committee

MISS HILDA LOINES, *Chairman*

PHILIP A. BENSON, *Vice-Chmn.*
EDWARD C. BLUM, *Ex officio*
MRS. WILLIAM H. CARY[1]
WILLIAM G. CREAMER
WALTER H. CRITTENDEN
LEWIS L. FAWCETT
MRS. LEWIS W. FRANCIS
WALTER HAMMITT
WILLIAM T. HUNTER
JAMES G. McDONALD, *Ex officio*
EDWIN P. MAYNARD
ROBERT MOSES, *Ex officio*
ALFRED E. MUDGE

Ex Officio Members of the Board

The Following Officials of the City of New York

THE MAYOR
THE COMPTROLLER
THE COMMISSIONER OF PARKS

GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Main 2–4433.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or McDonald-Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

[1] Resigned from the Board October 9, 1941.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Paper:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 91. Infection studies on the covered smut of oats. By Paul F. Brandwein. 19 pages. 1940.

No. 92. Breeding work toward the development of a timber type of blight-resistant chestnut. Report for 1939. By Arthur Harmount Graves. 5 pages. 1940.

No. 93. Notes on the Tennessee Flora. By H. K. Svenson. 50 pages. 1941.

No. 94. Inheritance of smut resistance in some oat hybrids. By George M. Reed. 7 pages. 1941.

No. 95. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1940. By Arthur Harmount Graves. 8 pages. 1941.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 9. The Rose Garden of the Brooklyn Botanic Garden. 12 illustrations, folded map. By Montague Free. Price, 50 cents.

Guide No. 10. Gardens within a garden: A general guide to the grounds of the Brooklyn Botanic Garden. Second Edition. 56 pages; 21 illustrations. Folded map. By C. Stuart Gager. Price, 25 cents; by mail, 30 cents.

Guide No. 11. List of shrubs, exclusive of conifers, growing outdoors in the Brooklyn Botanic Garden. 32 pages; 5 illustrations. By Charles F. Doney. Price, 25 cents; by mail, 30 cents.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI APRIL, 1942 NO. 2

CONTAINING THE

THIRTY-FIRST ANNUAL REPORT

OF THE

BROOKLYN BOTANIC GARDEN

1941

PUBLISHED QUARTERLY
AT PRINCE AND LEMON STREETS
LANCASTER, PA.
BY THE
BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

Scientific, Educational, and Administrative Officers

SCIENTIFIC AND EDUCATIONAL

The Staff

C. STUART GAGER, Ph.D., Sc.D., Pd.D., *Director*
MONTAGUE FREE, Certificate, Royal Botanic Gardens, Kew, *Horticulturist*
ARTHUR HARMOUNT GRAVES, Ph.D., *Curator of Public Instruction*
ALFRED GUNDERSEN, Docteur de l'Université (Paris), *Curator of Plants*
WILLIAM E. JORDAN, B.S., *Librarian*
GEORGE M. REED, Ph.D., *Curator of Plant Pathology*
ELLEN EDDY SHAW, M.A., *Curator of Elementary Instruction*
HENRY K. SVENSON, Ph.D., *Curator of the Herbarium*
MARGARET M. DORWARD, A.B., *Assistant Curator of Elementary Instruction*

Other Officers

MARY AVERILL, *Honorary Curator of Oriental Gardening and Floral Art*
HAROLD A. CAPARN, *Consulting Landscape Architect*
ELIZABETH REMSEN VAN BRUNT, *Honorary Curator of Culinary Herbs*

RALPH CURTISS BENEDICT, Ph.D., *Resident Investigator (Ferns)*
RALPH H. CHENEY, Sc.D., *Resident Investigator (Economic Plants)*

G. ELIZABETH ASHWELL, A.B., *Curatorial Assistant*
MICHALENA LEFRERE CARROLL, *Instructor*
EMILIE PERPALL CHICHESTER, *Library Assistant*
ELIZABETH CLARKE, A.B., *Curatorial Assistant*
CHARLES F. DONEY, M.S., *Assistant in Woody Plants*
WILLIAM H. DURKIN, *Curatorial Assistant*
ELSIE TWEMLOW HAMMOND, M.A., *Instructor*
FRANCES M. MINER, A.B., *Instructor*
HESTER M. RUSK, A.M., *Instructor*
MARGERY H. UDELL, *Curatorial Assistant*
L. GORDON UTTER, M.S., Ph.D., *Research Assistant*
JEANNE PHYLLIS WALTHER, A.M., *Research Assistant*

LOUIS BUHLE, *Photographer*
MAUD H. PURDY, *Artist*

ADMINISTRATIVE

THOMAS A. DONNELLY, *Secretary and Accountant*
EDNA PALMITIER SCHACHT, *Assistant Secretary*
JANE E. COFFIN, *Office Assistant*

MARIE-LOUISE HUBBARD, A.M., *Secretary to the Director*
FRANK STOLL, *Registrar and Custodian*

LAURA M. BREWSTER, *Stenographer*
VIRGINIA A. CLAY, *Stenographer*
CONSTANCE PURVES ELSON, B.A., *Stenographer*
LORRAINE LAROCHE, *Stenographer*
BETTY G. RILEY, *Stenographer*

Published Quarterly at Prince and Lemon Streets, Lancaster, Pa.
by the Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y.
Entered as second-class matter in the post-office at Lancaster, Pa., under act of August 24, 1912

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

FOUNDED, 1824. REINCORPORATED, 1890

ADRIAN VAN SINDEREN, *President.* EDWARD C. BLUM, *Chairman of the Board.*

THE DEPARTMENT OF EDUCATION

BROOKLYN ACADEMY OF MUSIC—30 LAFAYETTE AVENUE—STerling 3–6700

BROOKLYN BOTANIC GARDEN

1000 WASHINGTON AVENUE—MAin 2–4433

THE BROOKLYN MUSEUM

CENTRAL MUSEUM—EASTERN PARKWAY—NEvins 8–5000
CHILDREN'S MUSEUM—BROOKLYN AVENUE AND PARK PLACE
—PRospect 3–7117

MEMBERSHIP

You are cordially invited to become a member of one or all of the Departments of the Brooklyn Institute. The annual fee in each Department is $10, carrying full privileges in the division of your choice and partial privileges in the other two. Membership runs for twelve months from the time it is taken out.

THE DEPARTMENT OF EDUCATION offers its members free admission to more than 250 events: lectures, concerts, motion pictures, young people's programs, field trips, etc. Also: reduced rates for special courses and programs.

ADRIAN VAN SINDEREN, *Chairman, Governing Committee.* JULIUS BLOOM, *Director.*

THE BOTANIC GARDEN offers its members free admission to "Flower Days," Spring Inspection, field trips, and most classes of instruction. Also: docent services, privileges of library and herbarium, free publications, advice on all aspects of gardening, distribution of surplus plant material, and visiting membership privileges in the botanic gardens and museums of other cities.

MISS HILDA LOINES, *Chairman, Governing Committee.* DR. C. STUART GAGER, *Director.*

THE MUSEUM offers its members private views of exhibitions, admission to Museum courses, phonograph records and prints from its lending libraries, and docent services. Also: five Museum publications free of charge and other Museum publications at reduced prices.

WALTER H. CRITTENDEN, *Chairman, Governing Committee.* LAURANCE P. ROBERTS, *Director.*

THE BROOKLYN ACADEMY OF MUSIC is owned and operated by the Brooklyn Institute. Its Opera House, Music Hall, and Ballroom may be rented for concerts, plays, lectures, school ceremonies, dances, and other events.

WILLIAM T. HUNTER, *Chairman, Building Committee.* HERBERT T. SWIN, *Building Superintendent.*

PRIVILEGES OF MEMBERSHIP IN THE BROOKLYN BOTANIC GARDEN

The Brooklyn Botanic Garden renders a public service in its endeavor to advance a knowledge of plants, affording educational advantages and carrying on fundamental investigations. Members of the Garden have the opportunity of furthering these aims.

Special membership privileges are also offered as follows:

1. Advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, and the best ways to grow plants successfully, involving methods of culture, and control of insect and fungous pests. Inquiries regarding the identity of plants will be answered.
2. From time to time distribution of surplus ornamental plant material and seeds is made to members of the Garden.
3. Invitations for self and friends to the Annual Spring Inspection, and to spring and fall "Flower Days"; cards of admission to all exhibitions and openings preceding the admission of the general public, and to receptions; admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
4. Services of a guide (by appointment) for self and party, when visiting the Garden.
5. All courses of instruction are free to members. In laboratory courses a small fee is charged.
6. The Library and Herbarium are available for consultation.
7. Announcement cards concerning plants in bloom and the activities of the Garden are sent to members from time to time.
8. As part of its services, the Brooklyn Botanic Garden issues publications of general horticultural interest, and technical papers based upon the researches carried out at the Garden. Special *Guides* to plantations and collections, and *Leaflets* of popular information are distributed to all members; also the quarterly *Record,* which includes the Annual Report of the Garden's activities.
9. Membership privileges in other botanic gardens and museums outside of Greater New York are offered to our members when they are visiting other cities and on presentation of membership card in Brooklyn Botanic Garden.

CLUB MEMBERSHIPS

For many years the Botanic Garden has had the pleasure of co-operating in numerous ways with Garden Clubs, Women's Clubs, and other organizations of the Metropolitan area, and a plan has been adopted whereby such organizations may become definitely identified with the work of the Garden in promoting an interest in plant life and horticulture, as follows:

Annual Memberships.—Garden Clubs or other organizations may qualify as Annual Members of the Garden on election by the Board of Trustees and payment of the annual membership fee of Ten Dollars. Each annual member club may designate one of its officers or other member to receive such invitations, notices, and publications as go to individual annual members and to represent the club at all Botanic Garden functions, including "Flower Days" and the annual Spring Inspection in May.

The Club may also have the following privileges:

a. *The services of a Botanic Garden docent or guide* for a tour of the plantations or conservatories, followed by tea. No parties of less than six adults will be conducted. Schedule for such events must be arranged for in advance, at dates mutually convenient to the Botanic Garden and the Club.

b. *One extra-mural lecture a year* by a member of the Garden staff. The Garden supplies, on request, a list of staff members available for outside lectures.

Arrangements will be facilitated if the Club will, with each request, designate at least two names.

c. One member of the club is entitled annually to free tuition in courses of instruction for which tuition is charged to non-members. In Laboratory Courses a nominal fee is charged to cover cost of material.

Sustaining Memberships.—Any club or other organization may become a Sustaining Member of the Garden on election by the Board of Trustees and annual payment to the Garden of the sustaining membership fee of Twenty-five Dollars.

Sustaining membership clubs enjoy the full privileges of annual membership, not only in the Botanic Garden but also in the Brooklyn Museum and The Institute at the Academy of Music. They may designate three members who may receive free tuition in Botanic Garden courses of instruction for which tuition is charged to non-members. They are entitled each year to two extra-mural lectures free, by a lecturer chosen from the Garden's list of lecturers.

OUT-OF-TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco, Calif.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Cranbrook Institute of Science, Bloomfield Hills, Mich.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Field Museum of Natural History, Chicago, Ill.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, Calif.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following eight classes of membership may be taken out through the Botanic Garden:

1.	Annual, by annual payment of	$ 10
2.	Sustaining, by annual payment of	25
3.	Contributing, by annual payment of ..	100
4.	Life, by one payment of	500
5.	Permanent, by one payment of	2,500
6.	Donor, by one payment of	10,000
7.	Patron, by one payment of	25,000
8.	Benefactor, by one payment of	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to eight carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members also enjoy the special privileges indicated on a preceding page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, Main 2-4433.

NOTE: *Contributions to the Brooklyn Botanic Garden, through membership dues or otherwise, constitute proper deductions under the Federal and New York State Income Tax Laws.*

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical investigations.
3. Popular botanical publication.
4. The endowment of a lectureship, or a lecture course.
5. Botanical illustrations for publications and lectures.
6. The purchase and collecting of plants.
7. The beautifying of the grounds.
8. The purchase of publications for the library.
9. Extending and enriching our work of public education.
10. The establishing of prizes to be awarded by the Brooklyn Botanic Garden for botanical research, or for superior excellence of botanical work in the High Schools of the City of New York.

THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the cost of the present buildings (total cost, about $300,000), and other permanent improvements to a total of more than $281,000, has been met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time to time by the City, within the limits, and according to the terms of the annual Tax Budget appropriation.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden, from its beginning, to purchase all books for the library, all specimens for the herbarium, all lantern slides and photographic material, and numerous other items, and to pay certain salaries, with private funds.

The interest on One Million Dollars at the rate of 3.5 per cent, added to the present private funds income, would restore that income to the 1930 figure. The director will be glad to give full information as to the uses for which such additional income is needed.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a camera with tripod are not allowed in the Oriental Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists, and the public in general, may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on congested paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 301, or by mail (1000 Washington Avenue), or by telephone (MAin 2–4433).

FIG. 1. Willows along the Brook. Systematic Section. Planted, October, 1912. (10,111)

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI APRIL, 1942 NO. 2

THIRTY-FIRST ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN 1941

REPORT OF THE DIRECTOR[1]

TO THE BOTANIC GARDEN GOVERNING COMMITTEE:

I have the honor to present herewith my Thirty-first Annual Report.

In 1941 the Brooklyn Botanic Garden entered upon the fourth decade of its existence in a world that, in some respects, differs from that of 1910 as greatly as 1910 differed from the year 300 B.C., when Aristotle and Theophrastus were laying the foundations of botany in Athens. In 1910 automobiles were as scarce as horses are now, motion pictures had hardly reached the "nickleodeon" stage, and the radio had not yet come into public use—there was no such thing as broadcasting. There were no income taxes; women had no vote. The European and Asiatic nations were all governed by kings, "facism" and "totalitarianism," as such, had not been heard of, communism was a philosophical doctrine and not a political fact. Now all these things are part of the warp and woof of daily life.

The contrast is as great in the intellectual sphere. In 1910 the Newtonian mechanics held almost undisputed sway in physics, relativity was a new conception, the transmutation of one chemical element into another was still only a dream, not an accomplished fact, the atom had only just been shown to be particulate,

[1] Front cover page, "Roses of Yesterday" (Bronze), in the Rose Garden. Given, 1937, by Mrs. Walter V. Crawford, Greenwich, Conn.

the universe was not "known" to be "expanding"; vitamins, which are now deliberately included in our diet and our medicines and purchased by name at the grocers and druggists, had only just been discovered—a few of them; growth-promoting substances in plants were talked about but had not, as now, become familiar laboratory reagents; the science of Ecology was in the cradle, heredity was just beginning to be studied experimentally and quantitatively.

Moreover, in 1910 there prevailed national standards of taste and conduct in literature, art, and morals that were deeply rooted in the past and whose validity was generally recognized. There is always change, but the period of 1910 seemed characterized by relative stability, that of 1941 by instability. We have passed from a period of cosmos to one bordering on chaos.

Since the above paragraphs were penned the nation has been stunned by the perfidy of December 7, at Pearl Harbor, and we close the year with our country officially in a war against forces which are attempting "the greatest effort at universal disintegration ever undertaken."

It should be gratifying to the trustees, as it is to the staff, that while a gigantic and ruthless effort is being made in one part of the world to disrupt and destroy what has gone before, the work of the Botanic Garden is a part of the constructive, enduring activities of mankind—of perpetuating and enriching a civilization having its roots in the past, but ever evolving into something better and nobler.

Effect of the War on Botanic Gardens

The effect of the war on botanic gardens, as on colleges, museums, and scientific institutions generally, has been both direct and indirect. Some of them, like Kew, have been bombed; members of staff have been conscripted, killed, or driven into exile, or languish in concentration camps. Financial support has dwindled or ceased altogether. Research is hampered, publications have terminated or have been greatly reduced. This is reflected in the marked decrease in the number of our foreign exchanges. The international exchange of seeds has almost come to a stand-still, and the publication of "Lists of Seeds

Offered in Exchange" has been temporarily discontinued by nearly all gardens, including our own.

In the matter of publications, the Brooklyn Botanic Garden has adopted the plan of printing enough copies to supply our European exchanges and subscribers and storing them until such time as sanity and order may be restored in the world.

We should mention here the admirable plan of the American Library Association of placing a limited number of subscriptions for foreign scientific and educational periodicals for institutional subscribers in the countries at war, arranging to have the publishers store the copies as published until authorized to make delivery after the cessation of hostilities. Under this plan we have received 40 subscriptions to *Ecology* and 30 to *Genetics* for the 1941 volumes. Renewals for 1942 are also anticipated.

Our printers have assured us that they have provided paper stock sufficient for our various publications for one and possibly two years, unless there should be some unanticipated change in the situation.

New York City Defense Emergency

The first week in June we received Mayor LaGuardia's Defense Emergency Order No. 1, giving notice of the establishment of a Fire Department Auxiliary Corps and a Corps of Local Fire Wardens to function under the immediate direction of the Fire Defense Coordinator and appointing Patrick Walsh, Fire Commissioner and Acting Chief of the Fire Department, as Coordinator.

The letter called upon the heads of all City Departments, Bureaus, and Agencies to compile "a list of the names, ages, and home telephone numbers of all male employees between the ages of 18 and 55, who are not now classified in group 1A of the Selective Service Act, who are not now on military duty, and who are not crippled." The Botanic Garden prepared such a list and forwarded it to the Mayor as requested, together with a duplicate to the Fire Defense Coordinator. This list constituted the basis of a Fire Department Auxiliary Corps. Each Agency was instructed "to see to it that unlimited cooperation and assistance is given to the Fire Defense Coordinator in discharging the duties of his office."

Public Education

The Alfred T. White Tradition

The late Mr. Elihu Root, while chairman of the Trustees of the Carnegie Corporation, once reminded the President of the Corporation that it was the custodian of something less tangible than corporate funds but no less real. He stated that he referred to "The Andrew Carnegie Tradition."

In the same spirit it may be truly said that the Brooklyn Botanic Garden received from and through Mr. Alfred T. White not only generous contributions of funds for its work, but also an intangible, which may be fittingly designated as "The Alfred T. White Tradition." This is the tradition of public service. Mr. White's philosophy of life may be tersely expressed by the aphorism of Emerson: "To build the City is the great accomplishment, not to possess it." His later years were largely occupied, not in accumulating, but in using his resources, of time and ability as well as of money, in public service.

It was a leading idea in Mr. White's mind, when he decided to initiate a botanic garden in Brooklyn, that it would render an outstanding service to the City and to the public; and not only to the local public of Greater New York, but in a larger way, through its scientific and educational activities, to mankind in general.

Public service, therefore, in "The Alfred T. White Tradition," has always been in the forefront of the aims of the Brooklyn Botanic Garden, and this has been accomplished largely through the development of beautiful and instructive plantations and the program of public education based upon them. "For the advancement of botany and *the service of the City*"—this has been the dual aim from the beginning.

Advantageous Location of the Garden

The city of Greater New York, with a population of nearly 7,500,000 (U. S. enumerations as of April 1, 1941), has an area of about 320 square miles and the Garden is located about five miles south of the geographic center of this area (which is 2,000 feet north of Meeker Avenue bridge, Queens). Moreover the Interborough and the B.M.T. divisions of the subway system

have stations within a few feet of the gates, and entrances are only three or four minutes walk, or less, from six trolley lines. We are less than thirty minutes from Times Square, Manhattan, by either subway, and about thirty-five minutes by automobile.

The population of the Borough of Brooklyn (the most populous of the five Boroughs), as of the 1940 census, is nearly 2,700,000. The center of this population is 150 feet east of Bedford Avenue on the north side of Lenox Road. This is only about ten minutes walk from our nearest gate. Brooklyn also has the largest school population of any borough of the City.

Opportunity is thus literally at the very gates of the Garden. Easy access by rapid transit lines and automobile is annually bringing more and more visitors and school classes from other boroughs. *The Brooklyn Botanic Garden is a New York City institution*, an opportunity for all citizens and all schools of all boroughs, meriting city-wide support in return for city-wide service.

Registration and Attendance at Classes

The total registration for regular classwork was 1,797 (adults, 1,085; children, 712). The total attendance at all classes and lectures was 116,386 (Botanic Garden classes, 42,698; visiting classes from schools, 73,688). This is the largest class attendance in the history of the Garden. The corresponding figures for 1940 were 108,368 (41,239 and 67,129 respectively). Children's classes came from all five Boroughs of the city.

Adult Education

The appended report of the Curator of Public Instruction (p. 106) gives the details of the year's educational work with adults. Special attention is called to the classes for employees of the Department of Parks, who were given time off with pay so that they might take advantage of this opportunity. The work began in the Fall of 1940, with an enrollment of 86. The enrollment for 1941 was 67, naturally less than in 1940 as so many enrolled the first year. These classes are proving very popular and very practical and helpful.

Publication has included two illustrated Guides to the Garden collections, as follows:

Guide No. 11. List of shrubs exclusive of Conifers, growing outdoors in the Brooklyn Botanic Garden. 32 pages; 5 illustrations. By Charles F. Doney. In this Guide are listed 83 families, 265 genera, 1021 species and 230 varieties of shrubs represented at present in our plantations.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, cultivation, pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. The collection of Lilacs contains 220 species and varieties.

Botanic Garden publications, with prices, are announced on the back cover-page of this Report.

Publications by Staff members for 1941 include 10 technical articles in scientific journals, and 56 popular articles in newspapers and popular magazines.

News Releases, comprising some 57 items, have been sent by the Curator of Public Instruction at frequent intervals to all the Metropolitan newspapers. Several hundred clippings have been received from many different states.

The July 15 issue of the bi-monthly journal *Horticulture* contained a specially appreciated, illustrated article by the editor, based upon the Thirtieth Annual Report of the Garden.

Extra-mural lectures and addresses have been given by 17 members of staff—35 in Brooklyn and 67 in 39 cities and boroughs outside of Brooklyn, with a total attendance of 8,413.

Broadcasting by the Botanic Garden began in 1930 with talks about the Garden itself by the director over station WNYC. In 1932 the Garden united with the Agricultural Extension Service of Rutgers University (Mr. Wallace S. Moreland, director), the Garden Club of New Jersey, and the Federated Garden Clubs of New York State, to form the Radio Garden Club, giving regular broadcasts over station WOR, beginning, on our part, with nine broadcasts by Mr. Free in 1932. In 1936 these broadcasts began over the Mutual Broadcasting System's coast-to-coast network, 37 talks being given by the Garden. During the first half of this year (1941) 19 broadcasts were given, 7 over WOR and 12 over WNYC, following a printed program distributed to our members and others. Digests of these talks were published and extensively distributed by the Extension Service, up to and

including the final broadcast on June 30. Toward the end of the first half year the Mutual System had an opportunity to sell the time of the Radio Garden Club to a commercial organization and this terminated the Radio Garden Club. During the last half of 1941 seven broadcasts were given over WNYC, making a total of 26 for the year.

Elementary Instruction

As we have hitherto frequently explained, the Department of Elementary Instruction has to do primarily with children of Junior High School age, with Elementary School children, with the teachers of children, with garden clubs, and with other groups interested in elementary plant life and horticulture.

The future of the country's love of beauty and of its artistry lies in the children, said Mr. Lorado Taft, the sculptor, in an address accepting the gold medal of the Holland Society. The same thought was back of the work which Mr. Walter Damrosch did for many years for children in music, and which is still being carried on. These, of course, are only special cases, for the entire future of civilization depends upon those who are now children. It is well known that in the present holocaust in Europe the education of children in Nazi doctrine has played an important rôle. Science has been somewhat slow to recognize the importance of work with children, to become really and generally interested in it, and to act upon it.

Our educational work with children is a means of rendering a much needed and much appreciated civic service to the community. But, even more important than that, it affords an opportunity of giving future citizens and voters, at their most impressionable age, an elementary acquaintance with the method of science of assembling and objectively analyzing facts, of drawing only such conclusions as the facts warrant, and of suspending judgment in the absence of adequate data; of acquainting them with the nature and importance of botanic gardens, and their work in advancing and disseminating a knowledge and love of plants. The general public can hardly be expected to support institutions whose work—and the civic and social importance of whose work—they do not understand. The future of both gov-

ernmental and private support of scientific research (as of art, music, or religion) lies in those who are now children.

But it was not this seemingly "ulterior" motive that led to the inclusion of children's work in the educational program of the Brooklyn Botanic Garden. In fact, that thought was at first not in mind at all. The work was initiated because it was believed to be its own justification, and to be a most appropriate function of an institution organized to serve the entire community and supported in part by public taxation.

After thirty years of this work it is gratifying to recall how many boys and girls, having their eyes and minds opened and getting their inspiration here, have gone from our Children's Garden through high school and college courses to postgraduate research in some aspect of botanical science; and also, incidentally, to note how many of these boys and girls, now mature citizens, have become financial and moral supporters of the Botanic Garden.

A statement of this part of our work during 1941 may be found in the appended report of the Curator of Elementary Instruction, under whose leadership the work has been organized and conducted during the past twenty-eight years.

British Project. Special attention is called to Miss Shaw's report (p. 114) of the war-time assistance rendered, in 1941 for the second year, by the members of our Boys and Girls Club to the children, 5–15 years of age, of Northbourne, County Kent, England. During the two years our boys and girls have contributed and sent £35 in money and also large boxes of clothing.

Penny Packets of Seeds, distributed to school children for planting in school and home garden, have this year, for the first time, reached a total of more than one million. The exact figures are 1,055,158.

One Ton of Tomatoes. We have stated in previous reports that the Children's Garden is conducted primarily with reference to the education of children, but we never lose sight of the fact that, if it succeeds from that point of view, there will be a satisfactory crop. As evidence that there is, it may be noted that during each of the past three years (1939–1941) the children have harvested more than a ton of tomatoes, in addition to crops of

several other vegetables. The figures for tomatoes for 1941 are 2,029 pounds. In 1940 more than a ton of spinach and chard was raised; the average per year for the past three years was nearly three-quarters of a ton.

Bureau of Public Information

The Garden continues to function as a source of free public information on all aspects of plant life and gardening. As previously recorded, this service tends to increase each year, in the number and variety of requests received and in the geographic extent of those seeking information.

Research

"The American Philosophical Society, held at Philadelphia," was founded in 1743 by one of the most practical of America's early philosophers—Benjamin Franklin. Its full title states that it was founded "for Promoting Useful Knowledge." There is very little, if any, knowledge that is not useful in one way or another. The human race is not likely to ever have more knowledge than is needed, and it is doubtful if mankind ever engaged in any occupation more important than promoting useful knowledge.

It is doubtful, also, if any subdivision of learning contains a body of information more useful and essential to mankind than the knowledge of plant life. It is this science that underlies and rationalizes the most fundamental of all human occupations, namely, the art and practice of agriculture and horticulture.

No one who faces this fact, and also the further fact that what we do not know about plant life greatly exceeds what we do know, can doubt the importance of increasing that knowledge. The accumulation of new knowledge proceeds after the manner of training in morals—"Line upon line, precept upon precept." One cannot decide to make a great discovery, go at it, and accomplish it. The great desideratum is that everyone who is interested or in any way gifted in such matters shall participate in the search for new truth—in the mass attack on ignorance. From time to time, at comparatively rare intervals, a "great find" is reported. Sometimes it is stumbled onto; but it is never found, never even

stumbled onto, except by those who are diligently and intelligently on the search—re-searching.

The important thing for a scientific institution is to encourage research by its members of staff, to provide the necessary facilities, adequate compensation, laboratories, equipment, libraries, and favorable "atmosphere." Research must be considered an essential, legitimate part of the program of any institution which, like this botanic garden, has for its official, fundamental purpose the advancement and diffusion of knowledge. National governments should support research, of course; but so, also, should states and municipalities, who benefit and whose inhabitants benefit every hour of every day in intellectual enlightenment and from the application of the results of research to human comforts, human needs, human betterment.

The Botanic Garden itself is in constant need of new knowledge in connection with the administration of its own collections of living plants—knowledge of plant diseases, of plant relationships, of classification and nomenclature, of plant genetics, and of methods of cultivation and plant propagation.

So far, it has been possible to apply only a very small portion of the Botanic Garden budget to research—approximately twenty-two per cent a year. The endowment of research at the Brooklyn Botanic Garden would help to promote one of its aims as stated in the legislation providing for its establishment; it would increase and enrich its usefulness in a very fundamental manner, enabling it to render to the community, to various City departments, and to mankind in general larger returns on the investment of money and effort already made.

Research in progress during 1941 has included studies in plant pathology, plant breeding, systematic botany, ecology, local flora, and geographical botany. Detailed reports of this work may be found on pages 90–106, following. They are all of scientific interest and of scientific as well as practical importance.

Studies of Physiologic Races of Plant Pathogens

One of the most interesting and important findings in plant pathology during the past decades has been the discovery of physiologic races in the smuts of cereals. Specialized races of

the plant rusts were recognized by Dr. Joseph Schroeter as early as 1879, and in 1894 Jakob Eriksson published his classic work on the specialization of the cereal rust fungi. Since then, extensive studies on the relation of the parasitic fungi to their hosts have revealed widespread occurrence of this phenomenon.

Specialized races cannot be separated on the basis of any structural character; their differentiation depends upon their ability to infect some strains or varieties of hosts, while others are resistant.

The existence of physiologic races of the smuts on oats was first reported by Dr. George M. Reed in July, 1924 (*Brooklyn Bot. Gard. Record* 13: 103–124, *Amer. Jour. Bot.* 11: 483–492). In December of the same year, Dr. James A. Faris, research assistant with Dr. Reed at the Brooklyn Garden, published his discovery of specialized races of the covered smut of barley (*Phytopathology* 14: 537–557). These discoveries were based on experimental studies carried on at the Brooklyn Botanic Garden under an endowment provided by Mr. Alfred T. White, first Chairman of the Botanic Garden Governing Committee. In the *Brooklyn Bot. Gard. Record* 14: 42, April, 1925, a record of Dr. Faris' results demonstrating physiologic races of the bunt of wheat is made, and Dr. Reed published extensive data on this problem (*Brooklyn Bot. Gard. Record* 16: 41, April, 1926; 17: 45, April 1928; *Amer. Jour. Bot.* 15: 157–170, Feb., 1928). In April, 1927, Dr. Reed, Miss Swabey, and Miss Kolk, published their account of the discovery of physiologic differences between the head smut of corn and sorghum (*Bull. Torrey Bot. Club* 54: 295–310).

This year Dr. Reed reports the existence of a new specialized race of loose smut which attacks Victoria oats, and oat hybrids of which Victoria is one of the parents. Victoria has proved to be very resistant to hitherto known specialized races, and many excellent hybrid selections have been produced in recent years, one of their outstanding characteristics being their smut resistance. The discovery of this new physiologic race of smut is striking evidence of the complexity of successful plant breeding. A breeder may work along definite lines, and obtain excellent resistant strains of the plants with which he is working. Later,

he may discover that there are other races of fungi about which nothing was known, and their discovery compels a new start.

While these findings are of great importance with reference to cereal grains, they have a much wider significance. Physiologic races of plant pathogens are known among practically all groups of fungi—rusts, powdery mildews, downy mildews, smuts, etc. The knowledge of their existence and their capacity for infecting strains of cultivated plants is essential to successful breeding. Permanent, valuable results can only be obtained where they are fully recognized.

It may be mentioned that highly important results along the line of breeding disease-resistant plants—cereals, vegetables, and ornamentals—have been obtained, and provide one of the most valuable methods for the control of various types of disease. The discoveries in the field of physiologic specialization, however, emphasize the fact that successful breeding for any character of such complexity as disease resistance is a continuing problem. The breeder who proceeds with a thorough background of knowledge on the physiologic specialization and of the inheritance of disease resistance is most likely to succeed.

Control of Iris Thrips

Studies on methods of control of Iris thrips have been continued during the year by Dr. L. Gordon Utter in collaboration with Dr. Floyd F. Smith, of the Bureau of Entomology and Plant Quarantine, Washington, D. C. Thrips are a serious menace to the successful cultivation of Iris, and the City of New York (like many other cities) has tens of thousands of iris, planted in the parks and gardens and along the parkways of the City. To find an effective method of control of this troublesome pest is, therefore, of prime importance in the proper maintenance of these beautiful plantings, as well as the collection of bearded and beardless Iris at the Botanic Garden.

Exploration and Geographical Distribution

Of special popular interest is the study in geographical distribution, undertaken by Dr. Svenson in the early part of the year with the aid of a grant from the Guggenheim Foundation.

"Geographical distribution," wrote Sir Joseph Hooker, director of the Royal Botanic Gardens at Kew, "will be the key which will unlock the mystery of the species." With the development of modern genetics we should now probably say "one of the keys." "One of the starting points of Darwin's work," Sir Joseph continues, "had been the striking impression made on him by the distribution of the Galapagos organisms; hence his eager desire to know whether the botany of this isolated group was as suggestive as the zoology" (*Life and letters. Vol. I, p. 489*).

Darwin's statement in his *Autobiography* was as follows: "During the voyage of the Beagle [1831–1836] I had been deeply impressed by the South American character of most of the productions of the Galapagos archipelago, and more especially by the manner in which they differ slightly on each island of the group; none of the islands appearing to be very ancient in a geological sense. It was evident that such facts as these, as well as many others, could only be explained by the supposition that species gradually become modified; and the subject haunted me."

Dr. Svenson sailed for Ecuador from New York on January 30, on the S.S. Santa Elena, and returned on April 24. This was the twentieth trip, outside the local flora area, for botanical exploration and study since the Garden was established in 1910. The plants collected on this trip, in the form of herbarium specimens, are now being studied in comparison with species collected by Dr. Svenson on the Galapagos Islands during the Astor expedition, in 1930.

Chestnut Disease Studies

Dr. Graves, with assistants, has continued his studies of the destructive fungus disease of the American chestnut, and offers (pp. 94–99) a report of progress in the endeavor to bring back the chestnut by breeding a tree with lumber-producing trunk and immune or resistant to the disease. As we have pointed out in a preceding annual report (for 1923), this disease was first discovered in America in 1904 in the New York Zoological Park. It has caused the loss in New York City alone of tens of thousands of trees estimated to have had a monetary value of several million dollars. In Brooklyn alone a loss of some 17,000 chestnut

FIG. 2. Dean Clay Osborne Memorial: Tied Columns, Fountain, and Seats. South end of Long Green, Horticultural Section. (10,108)

trees has been reported, and it is now no longer possible to grow the American chestnut in New York City—not, in fact, in the entire country. It is, therefore, not only a responsibility but a prime interest of the City to contribute to a knowledge of how to combat and, if possible, to eradicate this tree disease.

Plantations

New Exhibits.—Among the new plantings during 1941, noted in the appended report of the horticulturist, special attention is called to the following:

The Ivy Garden, comprising all the hardy forms—about 56 in number—from our gold medal exhibit at the International Flower Show in March. This garden has been located under the partial shade afforded by the trees on the summit of Boulder Hill.

Flowering Cherries have been planted in two double rows, one on each side of the Esplanade, parallel to the Schwedler Maples. There are 19 trees in each row, or 76 in all, of the variety *Kwanzan* —the same as those on Cherry Walk. Barring accidents, these trees should make a glorious sight by the time they have become as large as those on Cherry Walk. The latter were purchased from the T. A. Havemeyer Nursery, Locust Valley, Long Island, March 29, 1921, and have therefore been planted here about 20 years. They are now perhaps 25–30 years old.

Six trees of "Shirotae" cherry, a white flowered variety, were planted on the Museum embankment as a northern terminus and contrast to the four rows.

Tall Bearded Iris has been planted in the 72 beds between the trees in each of the four rows—2,474 plants in 362 varieties. Thirteen individuals or firms cooperated in supplying us with these plants which have a catalog value (1941) of $1,863.40. The list of donors and their contributions may be found beginning on page 142 of this Report.

Fern Garden. An area south of the lake near the outlet has been set aside for some years as the site of a Fern Garden, which will mark the beginning of the collection of vascular plants in the systematic section. A portion of the limestone contributed in August by Mr. Augustus Whittingham, from his estate in New Jersey, has been placed here and will favor certain of the "lime-loving" species.

Fencing the Rock Garden.—The salvation of the Rose Garden and other special gardens has been the fact that it has been feasible to enclose each with a fence, thus making it possible to control entrance and to exclude dogs, baby carriages, and other undesirable things and persons. The Rock Garden, being located along one of the main arterial walks, has been difficult to protect from intentional and unintentional wear and tear. Dogs, although on leash, have had free access. In the absence of an attendant, for whom funds have not become available, boys very naturally race about, jumping from rock to rock and slipping down onto rare plants in flower. Notwithstanding signs, adults have always insisted on sitting on the rocks, with their feet almost always resting on plants and interfering with vines or branches that would otherwise cover some of the rocks. Wild rabbits, of which there are plenty in the Botanic Garden, have had full access. A special and greatly appreciated gift of funds from former residents of Brooklyn made it possible to fence in the Rock Garden during the past year.

Resurfacing the walks.—In the last Annual Report we recorded that the Department of Parks, with the aid of WPA labor, had resurfaced some 3,060 square yards of penitential walks that had sorely needed resurfacing for several years. The material used was "Laykold," a cold laid bituminous mix, Type 4. This was laid directly over the badly worn old surface of the walk. The same procedure was followed in 1941. In both years the Board of Estimate appropriated $1,000 from the account "General Accruals" to cover the cost of materials. The newly surfaced walk extends northward from White Oak Circle up to and including the Rose Arc; from the south end of Cherry Walk eastward along the Lake, and from the north end of the Rock Garden to the south Flatbush Avenue entrance—a total of 3,202 square yards.

This year, as last, the labor was provided by the WPA, and was under the efficient supervision of Mr. Edward P. King, Coordinating Engineer of the Park Department. The work began on July 18, and was completed July 22.

The Local Flora Section, in the northwest portion of the Garden, being largely concealed from view from the outside by screen

planting, has for some time been subject to petty vandalism, largely by boys who can easily climb over the street fence along Flatbush Avenue. Another and taller woven wire fence is badly needed, completely to enclose this area just inside the present inadequate fence. With the two fences this garden can be made practically inaccessible except through the official entrance and at official times when there is a gardener on duty there.

Winter Killing: As spring advanced it became increasingly evident that there had been much winter killing of shrubs. As noted in Mr. Free's report (p. 124), this was specially destructive of Rhododendrons. It is believed that most of this injury was done during the week of March 17–23. The New York weather bureau has summarized the weather for that period as follows:

The entire month of March was windier than normal, and during the period 17–23 the average wind velocity was considerably above 20 miles per hour with the 19th averaging 40 miles per hour. For 5-minute periods on the 18th and 19th, velocities of 60 miles per hour were recorded.

On Sunday, the 23d of March, following the period of high winds, the weather was extremely mild. On this day many were outdoors without an overcoat. These relatively high temperatures increased the water loss from leaves at a time when the soil was still frozen and when such a loss could not be replaced readily through the roots.

In April conifers showed bad effects, and later in the spring various deciduous trees showed dead branches, all correlated with the wide and abrupt fluctuations of temperature and the associated high winds.

The Library

Botany, of course, could not progress at all without the continuing, first-hand study of plants, but the science of botany, like all other "sciences," has now progressed so far that the background of all first-hand study must be an acquaintance with what has already been observed and recorded along the lines of the study in hand. Observation involves so much more than merely looking.

It is gratifying to know that the library is coming to be used more and more by the general public, but there is a definite limit

to the possibilities here on account of the small size of the reading room. The growth of the library itself and the increase in the number of readers constitute one of the urgent reasons for the increase in the Laboratory Building (pp. 86–88).

We repeat again, as we must continue to do until the requirement is met, the urgent need of a larger endowment for the library. It is not only an indispensable adjunct to the work of every other department of the Garden but, as just stated, it is serving a very useful and greatly appreciated purpose through being open free daily to the general public.

The decrease in the number of periodicals currently received from 1,024 in 1939 to 880 in 1940, and 818 in 1941—a loss of 206 in two years, is due of course to the war which has caused the suspension of publication of many scientific journals in the Old World, and has interfered with the circulation of others through the mails.

Special attention is called to the appended report of the librarian, including the record of 436 books bound and 2,000 pamphlet binders made by WPA bookbinders during the year.

The Herbarium

In the Annual Report for 1924 we recorded a gift from Miss Anna J. Pierrepont, of Brooklyn, of a collection of herbarium specimens of ferns and flowering plants of Florida. Miss Pierrepont, who died on November 17, 1940, left a bequest of $1,000 to the Brooklyn Botanic Garden, and on account of her botanical interest, as evidenced by her former gift, the bequest has been added to the small Herbarium Endowment Fund, increasing the principal from $3,000 to $4,000.

Cooperation

Federal Government: Works Progress Administration

As of June, 1941, there were fourteen persons assigned to the Garden by the WPA, as follows: 3 gardeners, 1 laboratory assistant, 6 office and classroom assistants, and 4 bookbinders doing Botanic Garden work at the Brooklyn Museum. On June 26, Mr. H. A. Hahn, project manager for museums, botanic gardens, libraries, etc., for Greater New York, called at the

Garden with Mr. Ray Poage, project supervisor for the Garden, and gave verbal notice that all WPA workers, both men and women, of whatever classification, would be removed at the close of work on June 30, and the project here terminated. Mr. Hahn stated that there would be a general reduction of WPA forces throughout the country, and that they were terminating all projects, including that at the Brooklyn Botanic Garden, where the small number of persons assigned entailed an undue amount of supervision and office work at headquarters in proportion to the number of workers.

This project, as detailed in preceding Annual Reports, began in 1931 and was therefore of ten years duration. When terminated it was officially known as Official Project 165–1–97–8, Work Project 4.

U. S. Bureau of Entomology and Plant Quarantine

The cooperation, through Dr. L. Gordon Utter, of our Department of Plant Pathology, with Dr. Floyd F. Smith, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, in the study of thrips (an insect pest of Iris), is noted on pages 93 and 94 of this report.

Department of Parks

On June 25, we shared with the nursery of the Park Department seeds of *Magnolia accuminata* collected from a wild tree in Wolfe County, Kentucky, and seeds of *M. tripetala* and *M. Fraseri*, which we had received from Mr. Frank McFarland, of the University of Kentucky.

Courses of Instruction for Park Department Employees are reported on page 59.

The cooperation of the Department of Parks in the resurfacing of 3,202 square yards of paved walks in the Garden has been recorded in detail on page 70.

About 30 benches were distributed throughout the Garden in May. These benches had been used at the World's Fair in 1939–40, and were obtained through the kind cooperation of Park Commissioner Robert Moses and the Borough Superintendent of Parks, Mr. R. C. Jenkins.

Board of Higher Education

The scholarship in Botanic Garden Classes, awarded annually to a student in Brooklyn College for superior work in biology, was awarded in April to Gordon Meyerhoff, and in October to Robert Gottlieb, both of whom were recommended by the Committee on Prizes and Scholarships of the Department of Biology of the College.

Much living plant material was supplied for the biology classes of all four colleges of the City College group—City College (Manhattan), Hunter College (Manhattan), Brooklyn College, and Queens College.

Dr. Ralph C. Benedict, professor of biology at the College, continued for his twenty-sixth year as resident investigator at the Garden, with special reference to ferns.

Board of Education

In-service Credit Classes. There were seven classes for Board of Education in-service credit—four in Elementary Instruction and three in Public Instruction departments, with a total registration of 303 (224 and 79, respectively).

The William Howard Taft High School, 172nd Street and Morris Avenue, Bronx Borough, was completed early in 1941. In response to an inquiry from the principal, Mr. Maurice E. Rogalin, we were happy to supply in November, for the planting of the school grounds, about 50 Rose Mallow, about 50 larger shrubs, and herbaceous plants, in numerous varieties from our nursery and duplicates from our horticultural section.

There were 1,118 classes accompanied by teachers visiting the Garden from public and private schools, with a total attendance of 73,688. On the spring and fall posters distributed to all schools, announcing talks at schools by members of the Garden staff, 38 topics were listed with the suggestion that talks on additional topics would be given if requested.

Department of Hospitals

The Horticulturist reports (p. 128) that in May the Garden contributed a quantity of herbaceous plants to the Triboro Hospital, which is conducted by the City Department of Hospi-

tals in Jamaica, Long Island. These were for window boxes, and included 80 plants of Germander (*Teucrium Chamaedrys*), 60 of Lavender Cotton (*Santolina incana*), and 15 of *Santolina viridis*.

Kings County Hospital, Brooklyn, was one of the four hospitals sending their nurses training classes for regular instruction during the year, as noted in the appended report of the curator of public instruction (p. 109).

The total number of nurses enrolled for regular class work was 232.

International Flower Show

The annual exhibit at the International Flower Show, conducted by the Horticultural Society of New York and the New York Florists Club, in Grand Central Palace, March 17–22, was an Ivy Garden. Not less than 76 species and forms of *Hedera* were installed by our gardeners under the supervision of the horticulturist, Mr. Montague Free, who planned the exhibit, so as to make an attractive garden effect. All the plants were carefully labeled. The exhibit aroused much public interest and admiration, and was awarded a gold medal by the Flower Show judges, and also the Bulkley gold medal for artistic, horticultural, and educational achievement—the highest award of the Garden Club of America. This is the second time the Garden has received a gold medal from the Garden Club of America, the first time being in 1933 for our exhibit of methods of plant propagation. The Garden is under obligations to Mr. William T. Hunter, of the Botanic Garden Governing Committee, who again, as for several years past, has placed at our disposal a covered truck and driver of his firm, A. Schrader's Son, for the purpose of taking the exhibit from the Garden to Grand Central Palace and bringing it back at the close of the show.

The installation of the hardy specimens from this exhibit as a permanent Ivy Garden on Boulder Hill is recorded on page 69. A *Leaflet*, "The Brooklyn Botanic Garden Exhibit of an Ivy Garden" (Series 28, No. 1–3), was freely distributed throughout the week of the show.

The Garden also received a "Certificate of Merit" for its exhibit of "Lenten Roses" (*Helleborus orientalis varieties*).

The Horticultural Committee of the Garden Club of America held a meeting at the Garden on December 9. Programs were arranged for both morning and afternoon, with luncheon in the Laboratory Building from 12 to 1:15. Mrs. Arthur Hoyt Scott, of Swarthmore, Pa., presided as chairman, and delegates were present from several states. Unfortunately, near the end of the luncheon, word was received by radio that enemy airplanes were approaching New York. This report was confirmed on telephoning the office of a local newspaper. A precipitate "adjournment" resulted, much to the distress and disappointment of the few who felt that the program should be carried out as planned. Subsequent expressions were to the effect that the meeting was an entire success up to the moment of "adjournment." It is hardly necessary to state that the heralded air raid never materialized. The event was suggestive as to what may be expected if an air raid actually occurs.

The Museums Council of New York. In the spring it came to the attention of the Council that officials and research experts from various countries in South and Central America were visiting the United States, and would from time to time continue to do so under the auspices of the Committee for International Cooperation in Latin America, Nelson P. Rockefeller, Chairman. Realizing that many of these representatives would inevitably visit New York City the council prepared a list of the Museums, Libraries, Historic Houses, Botanic Gardens, Zoological Parks, and Aquarium within the Greater City, and this was sent to all such visitors with a cordial invitation to visit these institutions, and to make full use of their facilities. The Brooklyn Botanic Garden was one of the cooperating institutions.

Spring Inspection

The annual Spring Inspection was held as usual on the second Tuesday in May—the 13th. This was the twenty-seventh inspection. The weather was perfect, and about 550 officials, members, and their friends attended. Fourteen groups of guests were taken for the tour of the grounds by members of the Garden

personnel, beginning at about 2:30 p.m. and continuing until 3:45. The itinerary included the new Ivy Garden on Boulder Hill; the Oriental Garden; the newly planted four rows of Flowering Cherries on the Esplanade, viewed this year for the first time; the Lilac collection, then in its prime; past the Rose Garden and Rose Arc and through the Barberries to the Pea Family in the Systematic Section, where the Wisterias, Golden Chain (*Laburnum*), and *Cytisus* were at their height of bloom.

Tea was served in the Laboratory Building by the Woman's Auxiliary. The following exhibits were on view during the serving of tea:

1. Thirty paintings of flowers in water-color tempera, by Mrs. J. Norman Carpenter, member of the Brooklyn Society of Artists. In the main rotunda and north corridor.

2. Thirty portraits of orchids and rare flowers, including the white orchid, *Phalaenopsis*, by Miss Tabea Hofmann, well-known illustrator. In Room 330.

3. Proposed Gate at the Eastern Parkway Entrance. Perspective in color, by architects, McKim, Mead and White. Main floor.

4. Portraits of botanists. About twenty new portraits have been added to the collection already on exhibition in the corridors.

Miscellaneous

National U.S.O. Campaign.—On June 27, the Women's Division of the United Service Organizations made an evening appeal at Ebbets Field, near the Garden, during a league baseball game. The 160 volunteers who took part held a preliminary meeting in the auditorium of the Laboratory Building for organization, instructions, and other preliminaries, before proceeding to Ebbets Field, where a total of $1,532.44 was collected from the audience at the game.

The Civilian Conservation Corps, under the supervision of Mr. Charles E. Morris, Landscape Architect, has been assembling a collection of botanical importance in the Virgin Islands, at Christiansted, St. Croix. In response to a request for seeds of palms and lists of commercial dealers in such seeds, we were

able to send 20 packets of surplus seeds received from foreign correspondents, and also a list of dealers.

The National Youth Administration has sent us during the year five boys. This cooperation began in 1938 with 32 youths assigned; in 1939 there were 34, and in 1940 there were 32. Since the Defense Program was initiated it has been less easy to get satisfactory boys as the best of them are assigned to Defense Schools. Our policy is to reject, after fair trial, and send back to the N.Y.A., those who do not prove satisfactory.

New York State Conservation Department.—In response to a request from Mr. John C. Jones, of the Wildlife Research Center of this Department, located at Delmar, N. Y., we supplied 72 packets of seeds for the reference collection of seeds of native and introduced plants of the Northeastern United States, which is being assembled at the Center.

The School Garden Association of New York, in November, asked for advice concerning plants for acid soil and shady conditions. Lists were furnished of woody and herbaceous perennials and annuals. The plan is to publish the list in the February (1942) number of the *Nature-Garden Guide*, issued monthly by the Association.

American Museum of Natural IIistory.—On June 3, Mr. Vincent Fusco, who is doing restoration work for prehistoric dioramas at the American Museum, was supplied with a living branch of the "Norfolk Island Pine" (*Araucaria excelsa*) to be used as a model for the placement of leaves. On October 6, we supplied the Museum with leaves and parts of leaves of Cycads for use in making Cycad restorations.

The National Association of Gardeners, Greater New York City Branch, held a meeting at the Garden on the evening of May 7. Mr. Free, Mr. George Bishop, foreman gardener, and Mr. R. S. Tilly, rose grower, addressed the meeting.

The Brooklyn Home for Aged Men and Couples has been conducting a garden on their grounds during the year to promote the interest of the residents of the home in outdoor activities. Assistance and advice has been given throughout the season by the assistant curator of elementary instruction, Miss Dorward, and members of the Botanic Garden and Woman's Auxiliary.

It is felt that the above instances of cooperation would be of general interest to our officials and members as indicating the wide diversity of ways in which a botanic garden may serve the public in addition to the regular educational and scientific work. It would be quite impractical to record in detail all the innumerable items of cooperation and service to individuals and to public and private institutions. In reviewing such work at the end of each year one cannot help being impressed with the possibilities for public service of such an institution as the Botanic Garden, and of what it would mean if the public were to be deprived of such services.

The Woman's Auxiliary

The Auxiliary, as always, has taken charge of the social events held at the Garden, including the Spring Inspection (see p. 76), Rose Garden Day in June, and Fall Rose Garden Day in October. At the annual meeting of the Auxiliary, held December 1 at the home of Mrs. Henry J. Davenport, the following officers were elected: Mrs. Glentworth R. Butler, honorary president; Miss Jessie H. Righter, president; Mrs. Walter F. Wells, vice president; Mrs. Earle P. Huff, secretary; Miss Dorothy L. Betts, treasurer.

Winter Party. The winter events of the Auxiliary, beginning with the Herb Luncheon on November 16, 1936, have been held at the Waldorf-Astoria Hotel. On January 25, 1938, the speaker was Mrs. Constance Spry, of London—her first lecture in the United States. In the winter of 1938–39 no social event was held. On February 16, 1940, the Waldorf-Astoria luncheon was followed by a lecture on "A sense of humus," by Mrs. Bertha Damon, author. For the winter of 1940–41 the meeting took the form of cooperation with the general campaign of all Departments of the Brooklyn Institute of Arts and Sciences to promote membership and a Borough-wide interest in the work of the Institute as a whole (see p. 80).

Membership

The total number of members, as of April 8, listed on pages 170–182, is 991. The Botanic Garden receives only one-third of

the dues of Contributing and Sustaining members, the remainder going in equal parts to the other two Departments of the Brooklyn Institute of Arts and Sciences, viz., the "Institute at the Academy of Music," and the Brooklyn Museum.

These figures, discouragingly small for an institution located in a city of some 7,500,000, and a borough of more than 2,700,000 population, indicate chiefly the effect of the financial depression that began in 1929, and the mounting burden of income taxes and other taxes, on the ability of the general public to take advantage of educational opportunities and to support institutions of general culture. They have also, no doubt, been affected adversely by the steadily increasing tendency of people to take advantage of the opportunity, made possible by the automobile, to move their residences from the city to the country.

In connection with the endeavor of the Brooklyn Institute to increase membership, and especially Contributing membership (annual payment, $100), meetings have been held during the year under the auspices of each of the three Departments. The Botanic Garden meeting was held on the afternoon of Monday, February 17, in the Laboratory Building, under the auspices of the Woman's Auxiliary, with the following program: Mrs. Henry J. Davenport, president of the Woman's Auxiliary, chairman; Remarks by Dr. Gager; Address by Mr. E. L. D. Seymour, Garden Editor of *The American Home*, subject, "Horticulture for Everybody." Address, Mrs. Tracy Voorhees, chairman of the Membership Committee of the Institute. Following the program there was an exhibition of Flower Arrangements in the main floor Rotunda, where tea was served. Sixteen new annual members and three sustaining members resulted from this event.

Personnel

Mr. Philip A. Benson, who has been a member of the Board and of the Botanic Garden Governing Committee since June, 1935, was, on June 12, 1941, made Vice-Chairman of the Committee. This was in accordance with an amendment to Section 3, Article IV, of the Constitution of the Brooklyn Institute of Arts and Sciences, adopted at the meeting of the Board on

June 12, 1941, providing for the regular appointment of "one or more Vice-Chairmen" of the various standing committees of the Board.

Miss Michalena LeFrere Carroll, instructor, was again, for the fifth summer, a member of the teaching staff of the Blue Ridge Southern Culture Institutes, Blue Ridge, North Carolina, July 22–August 31. She gave an intensive course in art history, and also an art appreciation credit course at Blue Ridge College.

Miss Elizabeth Clarke was appointed curatorial assistant in the department of plants, beginning April 1, 1941. She is a graduate of Hood College, Frederick, Md., and of the School of Horticulture for Women, Ambler, Pa. For three years she was garden consultant with the W. Atlee Burpee Co., Philadelphia.

Miss Virginia A. Clay was appointed stenographer in the office of the director, beginning March 1, 1941.

Dr. C. Stuart Gager, director, was made a member of the Board of Trustees and president, *pro tempore*, of the Fairchild Connecticut Garden at the organization meeting, held April 22, in Manhattan, in the office of Mr. Thomas J. Watson, president of the International Business Machines Corporation. The other trustees are Mr. and Mrs. B. Tappen Fairchild, who have maintained this garden of some 127 acres since the death, in 1939, of Mr. Benjamin Thomas Fairchild; Mr. Watson; Chancellor Harry Woodburn Chase, of New York University; Dr. Robert Cushman Murphy, curator of oceanic birds, American Museum of Natural History and Honorary President of the National Audubon Society; Dr. Elmer Drew Merrill, professor of botany and supervisor of the Arnold Arboretum, Harvard University; Dr. Frederick H. Pough, assistant curator of mineralogy, American Museum; and Mr. Percy H. Jennings, president of the Vita-Glass Corporation, who was made treasurer of the board. This garden, located on Quaker Ridge, North Greenwich, Connecticut, is incorporated as a non-profit, educational corporation. It is planned to make it a center of educational work for nature study and related subjects.

At the commencement exercises of Swarthmore College, June 2, it was announced that the Arthur Hoyt Scott Garden and Horticultural Award of a gold medal and $1,000 in cash had been

conferred upon Dr. Gager. The award has not been made annually. The previous recipients have been Mr. John C. Wister (1930), director, Swarthmore College Arboretum; Prof. Liberty Hyde Bailey, editor of the Standard Cyclopedia of Horticulture (1931); and Mr. J. Horace McFarland, former president of the American Rose Society (1939).

Dr. Gager was the official delegate of the Brooklyn Botanic Garden at the exercises, on September 15–17, in celebration of the one hundredth anniversary of the founding of St. John's College, Fordham, Bronx, New York City.

D. Elizabeth Marcy, Ph.D., research assistant in the Department of Plant Pathology since December 15, 1930, resigned on January 31, to accept a position as Instructor in Hunter College, New York City.

Miss Frances M. Miner, A.B., instructor in the Department of Elementary Instruction, was on leave of absence for three months (October–December) for the purpose of taking professional courses in the School of Education, New York University. In June she was re-elected President of the Garden Education Department of the National Education Association.

The appointment of Mrs. Margaret Burdick Putz, curatorial assistant at the Garden since August 1, 1931, was terminated February 15, by illness. Mrs. Putz first came to the Garden as Margaret Mann, on May 1, 1914, as assistant in the herbarium, remaining until October 31, 1924, when she resigned with the title of curatorial assistant. Subsequently she was employed temporarily, for eight weeks in 1930 and for three months (April to June) in 1931.

Miss Betty G. Riley was appointed stenographer in the herbarium as of November 1, 1941.

Miss Jeanne Phyllis Walther, A.M., was appointed research assistant as of February 1, 1941, in place of D. Elizabeth Marcy, resigned.

Financial

Gifts and Bequests

A list of the gifts received during 1941 is recorded on pages 142–149. These have all been acknowledged with the thanks of the Governing Committee and the director.

A bequest of $1,000 for the scientific work of the Garden was included in the will of Miss Anna J. Pierrepont, of Brooklyn, for many years an annual member of the Garden.

Capital Outlay Budget

Requests for the fiscal year, 1941–1942, were submitted to the City Planning Commission in the summer of 1941 as follows:

Pending Projects

1. Completion of Reconstruction of Plumbing System in Greenhouses and Laboratory Building	$ 5,000.00
2. Completion of Reconstruction of Heating System in Greenhouses and Laboratory Building	15,000.00

New Projects

1. Completion of Resurfacing of Paved Walks	7,500.00
2. Reconstruction of Outside Public Comfort Stations	8,000.00
3. Completion of Treatment of Ceilings, Corridors and Rooms with Acoustical Covering	2,760.00

Capital Budget Action of Board of Estimate

In the *City Record* for January 2, 1942, which carries in a special section the Proposed Capital Budget for 1942, projects of the Brooklyn Botanic Garden for which appropriations were adopted by the Board of Estimate during 1941 are listed on page 6 as follows:

PV. 184	Completion of Reconstruction of Plumbing System, Laboratory System	$ 5,000.00
PV. 185	Completion of Reconstruction of Heating System, Laboratory System	15,000.00

Other items requested do not appear in the Board of Estimate report.

Public and Private Funds, 1941

The total operating budget for the year 1941 was as follows, with comparison for 1940:

	1941	*1940*	*Decrease*
Tax Budget Funds	$ 93,308.57	$100,786.10	$ 7,477.53
Private Funds	88,957.73	94,081.52	5,123.79
Totals	$182,266.30	$194,867.62	$12,601.32

For the past eight years the percentages of the two budgets have been as follows:

	1934	*1935*	*1936*	*1937*	*1938*	*1939*	*1940*	*1941*
Tax Budget..	49.2%	48.3%	49.1%	49.8%	43.73%	48.2%	51.72%	51.19%
Private Funds	50.8%	51.7%	50.9%	50.2%	56.27%	51.8%	48.28%	48.81%

Endowment

The total of all Endowment Funds, as shown by the appended Financial Statement (p. 140), is $1,386,651.59. Of the total Private Funds income of $78,203.95 for 1941, $48,394.77 represents income from Endowment and $29,809.18, income from other sources which fluctuates from year to year.

During 1941 the small sum of $5,108.57 has been added to the Endowment Fund principal. Of this amount, $2,901.32 represents income from the new Endowment Increment Fund principal, and $2,207.25 represents amounts received by gift and bequest.

Endowment Increment Plan

In the last Annual Report a statement was given showing how, during the preceding nineteen years, by an endowment increment plan, $150,795.21 had been added to the endowment principal of the Garden. Among the sixteen funds included in this plan was the John D. Rockefeller fund of $250,000, contributed by Mr. Rockefeller in 1925, which was increased by contributions totalling $15,062.22, in addition to providing its share of the interest income of $58,418.83 which became the principal of the new Endowment Increment Fund, set up January 31, 1941 by resolution adopted by the Botanic Garden Governing Committee December 13, 1940. (*Thirtieth Ann. Rept. for 1940, pp. 73–76.*) The plan and its results were brought to the attention of Mr. Rockefeller, who has written the director as follows, under date of June 30, 1941:

"The information contained in your letter of June 18th regarding the gift which I made to the Brooklyn Botanic Garden in 1926 is not only gratifying to me but reflects great credit on you and your associates. The plan which you have been

FIG. 3. Proposed Main Entrance, Eastern Parkway. (6646)

following whenever possible of adding a percentage of the current income from endowment to endowment is an admirable one. I am glad to know of it."

The Work Before Us

Physical Development

In the preceding report there were listed four needs to be realized for the completion of the physical development of the garden as follows:

1. Construction of the Eastern Parkway Gate.
2. A gate at the North Flatbush Avenue entrance.
3. An addition to the Laboratory Building.
4. Completion of the planting of the Esplanade.

During 1941 item four was accomplished by the planting of the two double rows of Flowering Cherry trees, with Iris between the trees, as noted in the appended report of the Horticulturist. The first three items remain to be accomplished.

1. *The need of the proposed gate* at the Eastern Parkway entrance has been set forth several times in preceding reports. This would provide a suitable approach to a public institution at its principal entrance, where there is now only a hinged section of fence; it would provide a much needed room where visitors may wait for friends or find shelter in sudden storm, or be suitably cared for in case of emergency, and where visiting classes, garden clubs, and other organizations may assemble when visiting the Garden as a group; it would also provide a suitable place for vending guide books, souvenir post-cards, and other objects, and for storing small tools, thus avoiding the necessity of carrying them back and forth to the service yard, as now, at inconvenience and loss of time.

The design for this gate, prepared in 1927 by the architects, McKim, Mead and White, is again reproduced on the preceding page. The 1940 estimate of cost was $60,000 for cut stone all granite, and $53,000 for limestone on granite base—a modest sum, considering the cost of similar structures elsewhere.

This Eastern Parkway gate is now the only item still not provided of the ten improvements listed in "Views in Brooklyn

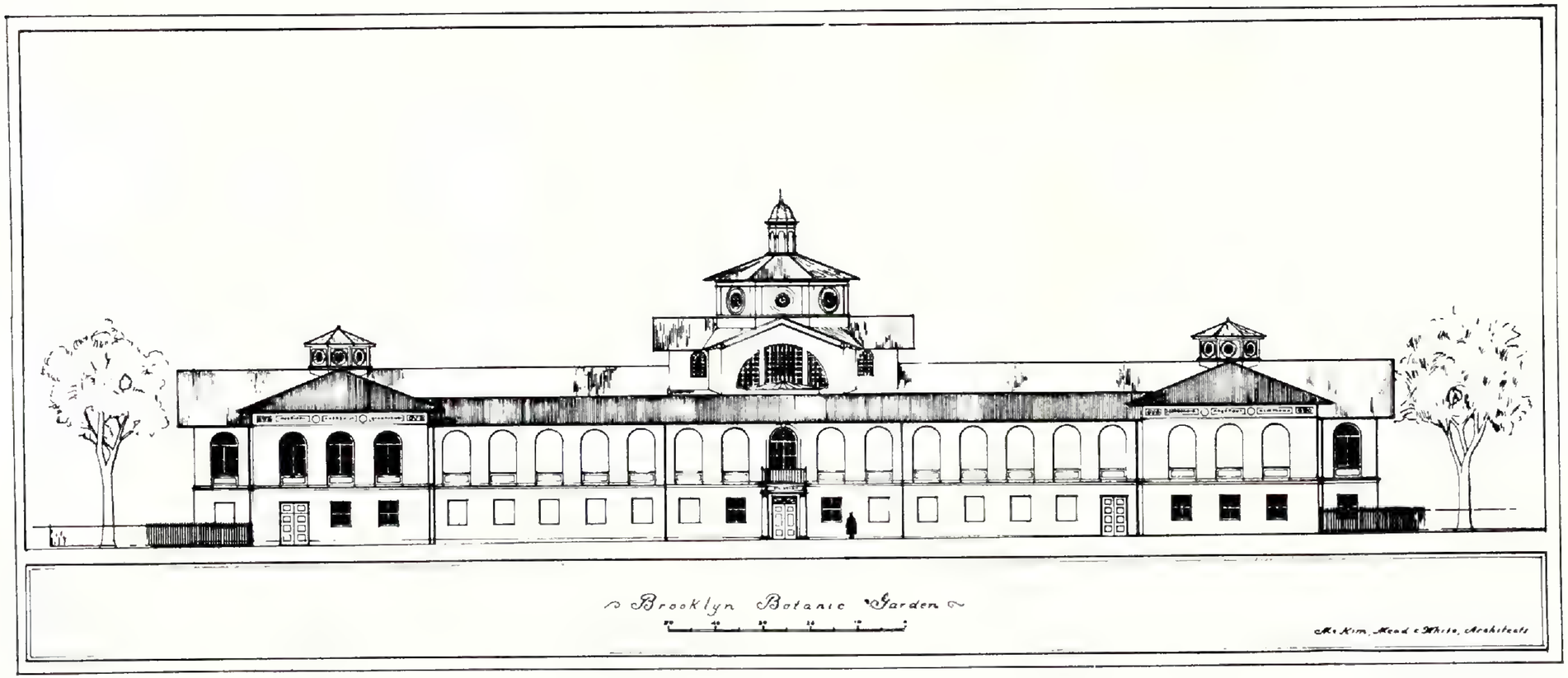


FIG. 4. Laboratory Building: Proposed Addition, Washington Avenue Elevation. (10,357)

Botanic Garden, 1930–1935," published in the Botanic Garden RECORD for May, 1930.

2. *A gate at the north Flatbush Avenue entrance.* The present temporary gate is a constant source of annoyance to the public and of trouble for the administration.

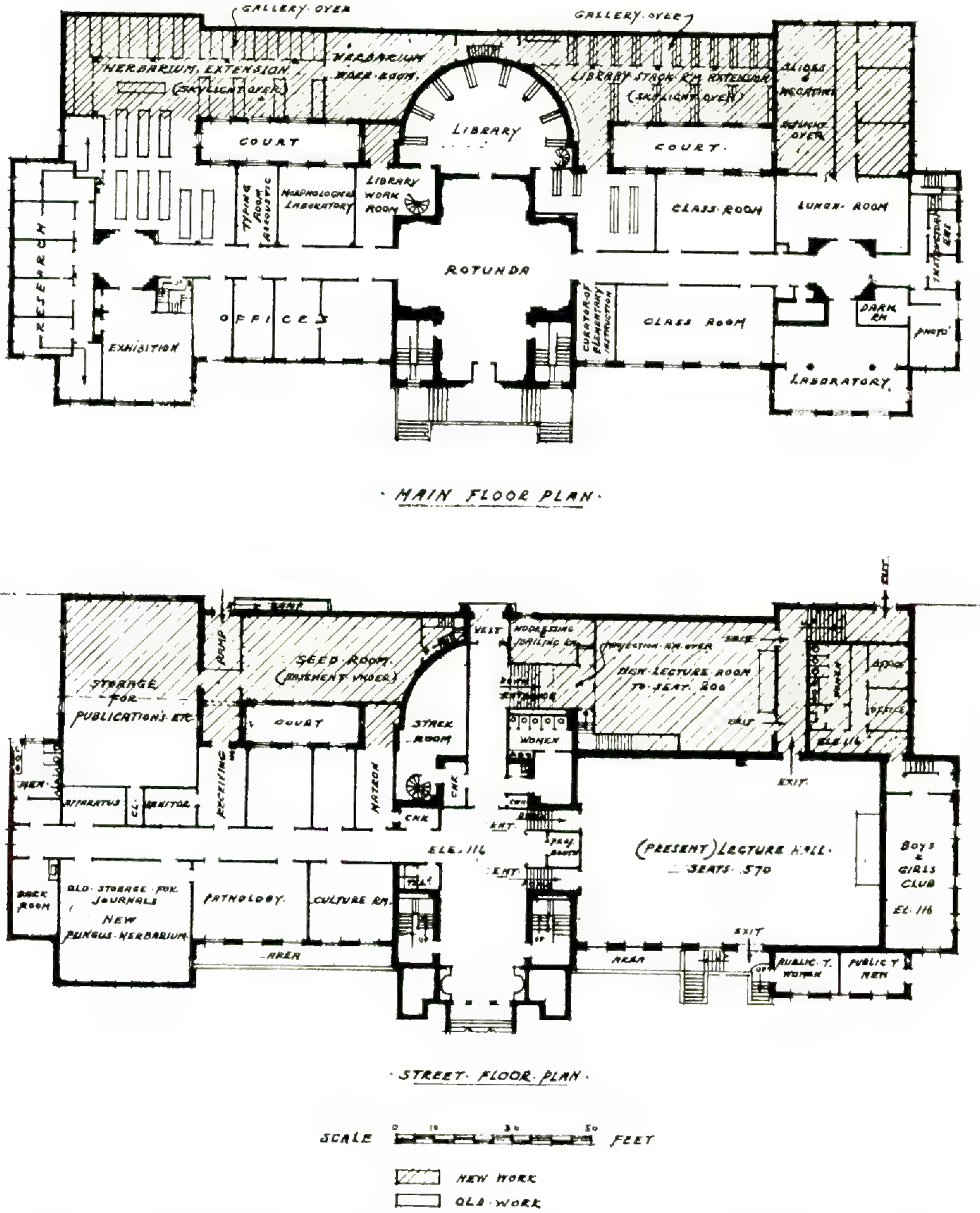


FIG. 5. Laboratory Building: Proposed Addition. Street Floor and Main Floor Plans. (10,383 and 10,384)

3. *An addition to the Laboratory Building.* The Garden has now quite outgrown the accommodations of this building which it was thought in 1910 would be adequate for all time. The library shelves are full to capacity, including the temporary wooden shelving that had to be provided in 1941; the herbarium has already expanded to the capacity of the two herbarium rooms; similar statements may be made with reference to the photographing room and the room for the storage and servicing of lantern slides and negatives. It is at times difficult to find room for visiting classes. The room for preparing each year more than 1,000,000 packets of seeds for school children is now wholly inadequate. A small auditorium, seating about 200 to 250 persons, is a need that is constantly felt.

The ground plan of the proposed extension of the building to the Washington Avenue street line, prepared by the architects of the original building, McKim, Mead and White, is shown in figure 4. The estimated cost for this addition, as of May, 1939, was approximately $200,000.

Personnel and Maintenance

The need for more gardeners would hardly seem to require elaboration after all that has been said in these reports for the past several years. While the plantations have grown steadily and the grounds have each year become more and more intensively cultivated, we have only the same number of men that we had twelve years ago—9 on the monthly payroll and 14 per diem men, a total of 23 men to care for some 50 acres of intensively planted gardens, with public conservatories, propagating houses, and nursery. This is less than two men per acre.

Better compensation for per diem men.—It is difficult to write of this with proper restraint. An injustice to these men is of long standing. For many years they have received less than the minimum per diem compensation in the Park Department and other regular City departments.

Retiring allowances.—It is now nearly fifteen years since a plan which, at that time, could have been easily financed was presented to the Governing Committee by the director but never approved. A plan for retiring allowances in scientific and

educational institutions is now almost universal, and the lack of such a provision here is a decided handicap in retaining an efficient personnel and in making new appointments.

Respectfully submitted,

C. STUART GAGER,
Director.

REPORTS ON RESEARCH FOR 1941

PLANT PATHOLOGY

BY GEORGE M. REED

A New Race of Loose Smut of Oats

The most important discovery in the investigations in 1941 is that of a new specialized race of loose smut which attacks Victoria and many hybrid selections of which it is one of the parents. Twenty-nine definite specialized races of loose smut and 14 of covered smut have been described and, so far as tested, none of these has been able to infect Victoria. The Victoria variety has been used extensively in oat hybridization and many of the selections are highly adapted to certain oat-growing areas. The new race of smut is based upon a collection obtained some years ago from Oklahoma and seems to belong to the Fulghum group of loose-smut races. Its most important characteristic is its ability to infect Victoria and selections from Victoria crosses. These studies have been made in cooperation with Mr. T. R. Stanton, Senior Agronomist, Division of Cereal Crops and Diseases, Bureau of Plant Industry, Washington, D. C.

Studies on the Inheritance of Smut Resistance

Further studies were made on three hybrids in which the Navarro oat was one of the parents. This variety is noted for its high degree of resistance to all known races of loose and covered smut with which it has been tested, no collection of smut having been found which is able to infect it. Navarro was crossed with varieties which showed interesting reactions to different races of smut. The second and third generations of Navarro X

Hull-less were inoculated with four races, to all of which Hull-less was susceptible. The data for the hybrid plants, inoculated with race 1 of the loose smut, indicate a two factor relation for the inheritance of resistance, while a three factor difference is indicated for the hybrids when inoculated with races 1 and 7 of the covered smut. The progenies inoculated with race 12 of loose smut differ markedly from these results. There is a high percentage of infected second generation plants, and in the third generation there is a great excess of segregating and susceptible progenies over the resistant ones. Second and third generations of the hybrids between Navarro and Black Mesdag were grown, and five distinct factors for inheritance of resistance to two races of covered smut are indicated, and three factors for one race of loose smut. The results are particularly interesting because Black Mesdag is susceptible to both races of covered smut, but fully resistant to the loose smut, Navarro being resistant to all these races. In the hybrid between Navarro and Gothland, the latter being susceptible to race 1 of loose smut, the results indicate that inheritance of the resistant quality depends upon two factors.

The Effect of Smut Infection on Seedlings of Resistant and Susceptible Oat Varieties

Miss Jeanne P. Walther, research assistant, carried out a series of experiments in order to determine the effect of inoculation on the growth of resistant and susceptible varieties of oats. Many varieties, inoculated with different races of loose and covered smut, were grown. In general, a reduced emergence rate of the inoculated seedlings as compared with the non-inoculated was noted. Varieties inoculated with races of covered smut to which they were susceptible showed only a slight reduction in growth, but when they were inoculated with races to which they were resistant there was a decided retardation. Similar results were observed in the case of varieties in their reaction to the loose smut. Some varieties susceptible to both loose and covered smut races showed retarded growth when inoculated. On the other hand, they appeared to be somewhat stimulated when inoculated with races of smut to which they were resistant.

The results of these investigations were presented as a thesis in partial fulfillment of the degree of Master of Arts at Columbia University.

Studies on Experimentally Produced Physiologic Races of the Oat Smuts

Dr. L. Gordon Utter, research assistant, continued his studies on the infection behavior of 40 collections of smut which originated from the hybridization of race 1 of the loose and covered smuts of oats. Twenty-four of these collections showed the symptoms and morphology of the covered smut, while 16 resembled the loose smut. The covered smut collections were primarily selected on their ability to attack Gothland, which was resistant to race 1 of the covered smut. Monarch was resistant to most of them, although susceptible to race 1 of the covered smut used in crossing. Similarly, the selected loose smut collections infected Monarch, resistant to race 1 of the loose smut, more frequently than they did the usually susceptible Gothland. Two collections of the covered smut and four of the loose smut behaved on Gothland and Monarch in the same manner as the original loose and covered smut parents, and thus appear to be the parental types which have segregated out.

When the infection data from 1941 were combined with those from 1938–1940, the earlier establishment of many of these collections as physiologic races could be clearly confirmed. Thirteen races of the covered smut were separated on eight varieties of oats, including Gothland and Monarch. Most of these oat varieties were resistant to race 1 of the covered smut. However, each variety proved to be susceptible to some of the new races and resistant to others.

Similar results were obtained with nine loose smut races which were separated on six oat varieties. Although all the varieties used, except Monarch, were susceptible to race 1 of the loose smut, they showed susceptibility to some of the new races and resistance to the remainder.

In both the loose and covered smuts, certain collections behaved identically on those oat varieties which distinguished the races above. The evidence indicates that most of these collec-

tions may be separated as distinct physiologic races in the future by using additional oat varieties.

Experiments on the Control of Iris Thrips

Spray tests for the control of iris thrips, made by Dr. L. Gordon Utter, in cooperation with Dr. Floyd F. Smith, of the Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine, Washington, D. C., were brought to a conclusion. Eight applications of various spray combinations and dusts were made on test plots of iris plants at weekly intervals during May and June. Spray combinations of derris powder (.02 per cent. rotenone) with sulfonated castor oil (1–400) as a spreader, and 40 per cent. nicotine sulfate (1–450) with Grasselli Spreader Sticker (1–1000) continued to give exceedingly high control of the thrips. A commercial derris extract spray (1 per cent. rotenone) and a derris dust (1 per cent. rotenone) also appeared to be effective. The results obtained with spray combinations having reduced derris or nicotine content were not sufficient to recommend them for general use. This is also true for certain commercial insecticides included in these tests for the first time.

Preliminary tests undertaken by Dr. Smith at Beltsville, Md., indicated that the iris thrips could be killed within the iris plants when fumigated with methyl bromide at the rate of 2½ lbs. per 1000 cu. ft. of space for 2½ hours at 74–78° F. Consequently, tests were made at the Bureau of Entomology and Plant Quarantine Bulb Station, Babylon, N. Y., in cooperation with Mr. S. F. Blanton, to determine the tolerance of iris to fumigations with methyl bromide. Planting divisions of numerous varieties of Japanese and bearded iris and several iris species, including hybrids, were subjected to methyl bromide fumigations at the 2½ and 3 lbs. rate in April, May, July, and September. Both treated and untreated divisions were planted in field plots. The treatment periods generally coincided with the time of year when some of the species or varieties are best transplanted. Preliminary results have indicated that no critical differences existed between the treated plants or between them and the untreated ones in any of the iris varieties or species tested. In general, the April

and May series showed more rapid recovery and growth, including some flowering, than the July and September series. Poor survival of both treated and untreated plants of *Iris halophila* and the Southern iris was obtained in April and May. This behavior corresponds to the normal failure of these iris to respond to transplanting at that season. The final analysis of these results will require observations next season.

These investigations offer considerable promise because methyl bromide fumigation is now the recommended method for eradicating Japanese beetle larvae from nursery stock intended for shipment outside of the quarantine areas. Since the dosage of methyl bromide (2½ lbs.) is the same for Japanese beetle and iris thrips control, a knowledge of the tolerance of iris to this chemical will have a two-fold value.

Student Volunteers

Miss Olga Jonelunas and Miss Georgianna Jurasek, students in Hunter College, volunteered their services in connection with some of the experimental work.

Chestnut Breeding Work in 1941 *

By Arthur Harmount Graves

This work has as its main object the development, through breeding, of a timber type of chestnut, resistant to the blight or bark disease. This disease has killed practically all the merchantable chestnut timber in the United States, throughout the natural range of this tree, involving a loss of many millions of dollars. The disease is caused by a fungus, *Endothia parasitica.*

Since the Japanese chestnut (*Castanea crenata*) is comparatively resistant to the blight, we crossed this with the American species, *C. dentata*, aiming to combine the height growth of the American with the disease resistance of the Japanese. The Japanese trees are rather low in stature, and could never replace the American chestnut as timber grees. The first crosses from which we now have trees growing were made in 1931, so that these Japanese-American hybrids have now completed their tenth

* A more detailed account will be published in a forthcoming issue of the Bulletin of the Torrey Botanical Club.

year. Their rate of growth has exceeded all expectations—in several cases, as previously reported, 4 feet per year—while that of the American chestnut seedling is about one foot per year. Furthermore, the erect habit of the American chestnut is very evident in these F_1 hybrids. This difference from the low-growing, shrubby habit of the Japanese species is perfectly obvious to one who visits our plantations. The remarkably rapid growth of the F_1 hybrid is evidently due to the phenomenon known as hybrid vigor, or heterosis. In addition to this vegetative vigor, in many cases a sexual precocity has been manifested; that is, it is not at all unusual for these hybrids to blossom in the third year of their growth. (See Report for 1935, BROOKLYN BOT. GARD. RECORD **25**: 63. 1936; also Report for 1937, BROOKLYN BOT. GARD. RECORD **27**: 49. Fig. 4. 1938.)

The susceptibility to disease of these Japanese-American hybrids has been already reported (see Reports for 1938, 39, and 40). It has become more and more evident that in these Japanese-American crosses the American parent is dominant in the habit of growth, and incompletely dominant as regards disease susceptibility, the two characters with which we are especially concerned. Without going into the genetics of the case in detail, it is obvious that, under the circumstances, one way to achieve the desired result, namely, a disease-resistant chestnut of timber type, is to interbreed these Japanese-Americans with each other. Of the next generation, some should apparently have the desired characteristics. Of these, one or more may be absolutely pure, but others would have to be bred further to produce the desired result, i.e., to serve as reliable breeding stock. Another way would be to back-cross the Japanese-Americans with resistant Japanese, and after selecting the tall individuals, another interbreeding should produce pure, tall, and disease resistant offspring in greater numbers.* This situation was foreseen as far back as 1937, when we began interbreeding the hybrids and back-crossing with resistant Japanese and Chinese.

Thus we already have a considerable number (now 4 years old) of 2nd generation or F_2 hybrids resulting from these crosses.

* This reasoning is, of course, in the present state of our knowledge, largely hypothetical.

First inoculation tests (for method of inoculation see Report for 1937. Brooklyn Bot. Gard. Record 27: 51. 1938) made last September and October already indicate that some of them have the required resistance.

Fig. 6. Hybrid Chestnut (*C. crenata* × *C. dentata*, Hammond 99A–33) eight years old, badly blighted at base. To save it for further breeding work, 3 basal shoots (one concealed by trunk) have been grafted into trunk. One of 5 hybrids thus treated. (10,294)

Method of Circumventing the Blight.—In order to keep the Japanese-American hybrids in a healthy, vigorous condition so that the breeding can be continued, the following method was devised. Any chestnut, not long after the blight attacks it to any extent on the main trunk, usually develops shoots or "suckers" from the base of the trunk, especially if the lesion is near the base. In case the blight fungus attacks the base of the tree, as often happens, it is then a simple matter to take the strongest of these shoots and graft it or them into the healthy bark of the trunk above the diseased part. This was done in April of last year successfully with 5 of our best Japanese-American hybrids (see fig. 6) and last fall we harvested valuable hybrid nuts from these trees.

Pollen Contributed in 1941

Pollen of the chestnut was received in 1941 from the following persons. We are glad to have this opportunity of expressing here our thanks for this splendid cooperation.

June 20. From Mr. R. B. Clapper, Div. Forest Path., U.S.D.A., Glenndale, Md. *C. dentata*. (F.P. 1000, from tree of G. F. Gravatt.)

June 24, 27, and 30; July 1 and 2. From Mr. J. C. McDaniel of East Lansing, Mich. *C. dentata*.

June 24 and 27. From Mr. Richard Lazarus, of Milford, Conn. *C. dentata*.

June 27 and 28. From Mr. Philip Smith, of Pawling, N. Y. *C. dentata*.

June 28 and July 2. From Mr. E. J. Grassmann, of Elizabeth, N. J. *C. dentata*.

June 30. From Mr. J. C. McDaniel, from Norris, Tenn. *C. mollissima* × *C. dentata* "TU-Ca-2."

June 30. From Mr. Joseph St. John, of Monroe, N. Y. *C. dentata*.

July 1. From Mr. J. C. McDaniel, from Jackson Co., N. C. *C. dentata*.

July 8. From Dr. Waldo Craig, W. Va. Dept. Agric., Charleston, W. Va. *C. dentata*.

Cross Pollination Work in 1941.—The season was unusually early. The first blossoms appeared on June 7, and the first nuts were harvested even as early as August 31. 260 hybrid nuts were obtained. Three new hybrids representing combinations new to science were obtained, making a total of 51 new hybrids to date. We have now a collection of over 1000 hybrids of various pedigrees growing in our plantations at Hamden, Conn.

Visitors.—On June 25 a delegation of about forty members of the Phytopathological Society of America visited the plantations. This visit was made in connection with the summer meeting of the A. A. A. S. at Durham, N. H. Among the visitors during the summer were Dr. E. W. Sinnott, Professor of Botany at Yale University, and Dr. D. F. Jones, Geneticist at the Connecticut Agricultural Experiment Station, New Haven, Conn.

Cooperation.—The crossing of the American chestnut with the resistant Chinese species is another method of attack in this problem. Our first crosses of these two species were made in 1934, and since that time we have accumulated a large variety of hybrids containing Chinese blood. Through Mr. Henry

Hicock, of the Connecticut Agricultural Experiment Station, we have been especially fortunate during the past year in receiving an offer of cooperation from the White Foundation, Litchfield, Conn. Mr. William Mitchell Van Winkle, president, and Mr. Clifford Ongley, superintendent, have offered to take over these hybrids of Chinese-American stock, and continue the breeding under our direction. The Avon Old Farms School, Avon, Conn., through Mr. Holland R. Sperry, and the Choate School, Wallingford, Conn., through Mr. George St. John and Mr. John Wilfong, are cooperating in a similar manner on other problems. The list of all those cooperating with us is too extensive to include here. The Fox Experimental Forest, Hillsboro, N. H., through Mr. Henry I. Baldwin; the Yale School of Forestry, through Prof. R. C. Hawley; the Dept. of Forestry of the State of Conn., through Mr. Austin Hawes; and the Conn. Forest and Park Assoc., through Prof. H. H. Chapman and Mr. J. Walter Bassett are some of the other cooperating agencies. To these and to all other institutions and individuals who have helped us we are pleased to acknowledge our indebtedness.

As in former years we have continued to enjoy the cordial cooperation of the Division of Forest Pathology, U.S.D.A.

Nuts Received in 1941 with List of Donors

We welcome this opportunity of expressing our appreciation to the many persons who sent us nuts in 1941. As in 1940, the list includes many States, and is ample evidence of the general interest in this problem. It is very important that nuts mailed to us should be kept fairly moist, by wrapping in sphagnum moss, moist cotton, etc. Drying kills the embryo and prevents germination. Address: A. H. Graves, Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, N. Y.

January 24. *C. mollissima* from Mr. Willard Simpson, Horticultural Experiment Station, Peitaho Beach, Kiangsu, China.

September. *C. dentata* from Mrs. Fyte, Wellesley, Mass.; Mr. H. B. Mosle, Litchfield, Conn.; Mr. James J. McKenna, Reading, Penna.; Dr. Jay H. Schmidt, New York City; Mr. H. H. Tryon, Black Rock Forest, Cornwall-on-Hud-

son, N. Y.; Miss Margaret McKenny, Sharon, Conn.; Mr. Paul Schauland, Waterbury, Conn.

October. *C. dentata* from Mr. E. W. Eddy, New York City; Mr. Floyd W. Callward, State Extension Forester, Connecticut State College, Storrs, Conn.; Prof. Lewis J. Johnson, Hopkinton, Mass. (through Mr. C. A. Weatherby of the Gray Herbarium, Harvard University); Mr. Arthur Davis, Norwalk, Ohio; Mr. Burton N. Gates (through Mr. Harold K. Brigham), Worcester, Mass.; Mr. P. H. Smith, Pawling, N. Y.; Mr. Lawrence Goetz, Woodstock, Ulster Co., N. Y.; Mrs. Wm. Allen Pusey, Elizabethtown, Ky.; Mr. J. F. Smith, Suffield, Conn.; Mr. C. P. Englund, Holmdel, N. J.; Miss Edith Von Elz, Cragsmoor, Orange Co., N. Y.

C. crenata from Mrs. P. W. Hammond, Syosset, L. I.; Mr. H. Vanderbeek, Pomfret, Conn., through Mr. Floyd M. Callward.

November. *C. dentata* from Mr. Alfred Frueh, Sharon, Conn.

C. crenata and *C. mollissima* from Mr. Ralph H. Morton, Weymouth, Mass.

Flower Structure and the Classification of Dicotyledons

By Alfred Gundersen

The study of the development and comparison of flower structures of Dicotyledons has been continued so far as time has permitted. Miss Maud H. Purdy completed another color study of *Ipomoea tricolor*. The study of flowers with parietal placentation and their suspected relationships is being continued.

Why these groups? The diagram of Dicotyledons (Fig. 7) was published by Engler forty-five years ago, in 1897. It shows Rhoeadales (Poppy Group) and Parietales (Rockrose Group) as connected. If these groups are placed adjacent, it eliminates a significant difference between the Engler and the Bentham-Hooker systems. That would place a large group of families near the important Ranales or Magnolia group.

The phylogenetic picture of Angiosperms, with their branches, is decidedly shrub-like, rather than tree-like, said Winkler in 1935.

In the second diagram the names and sequence of the groups are the same, only Sympetalae and most Apetalae have not been included. The names are shifted slightly right or left to call attention to additional possible relationships indicated by dotted

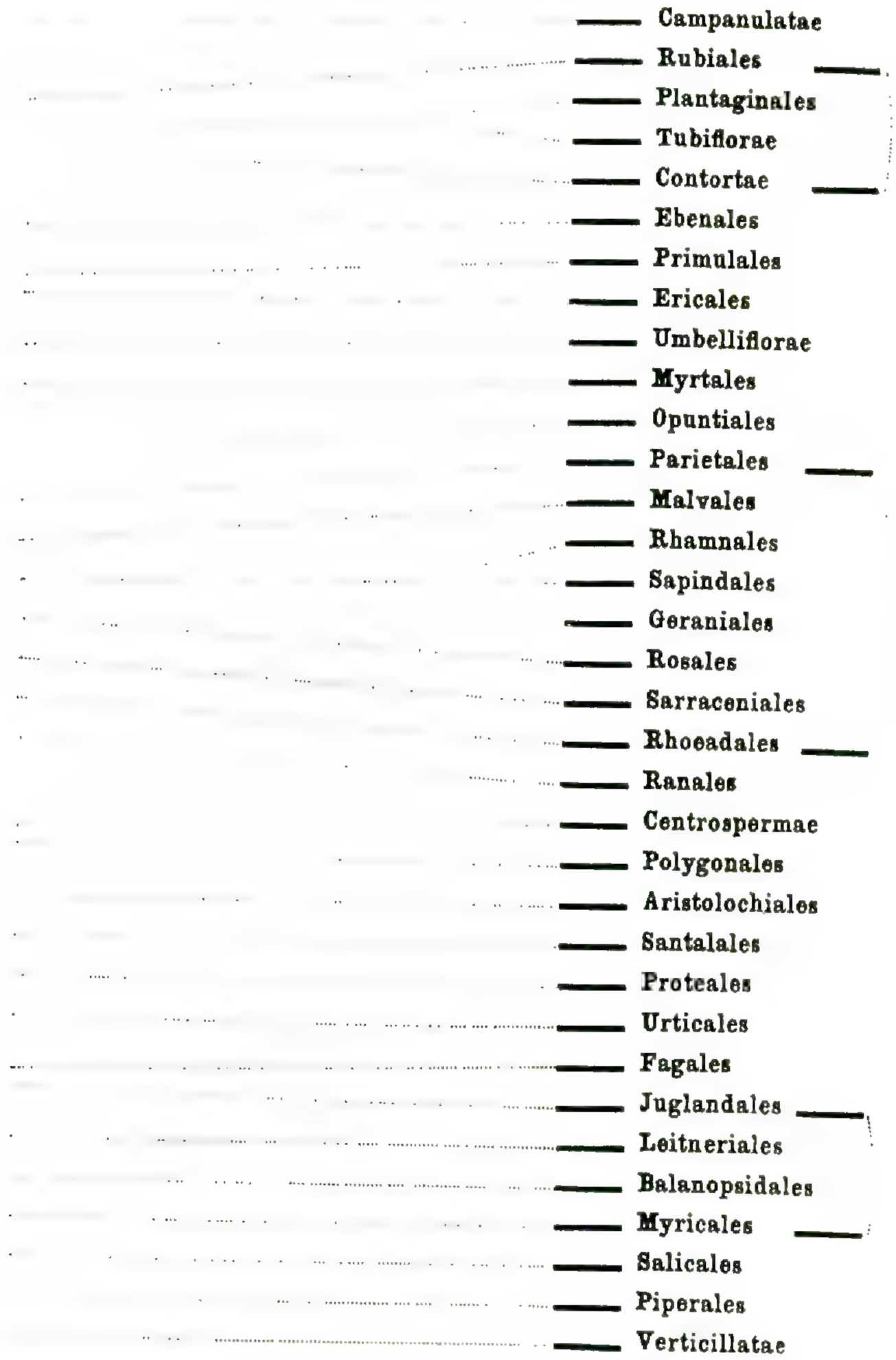


FIG. 7. Synopsis of the Orders of Dicotyledons according to their mutual relationships. After Engler, 1897. (4295)

lines. Numerous resemblances become explicable by a rearrangement of certain groups. The fact that parietal placentation in the bud often precedes axile placentation in the flower may reasonably be supposed to be another case where ontogeny recapitulates phylogeny. From separate placentae to united

placentae is suggestive of many other cases of fusion of flower parts (Fig. 9).

Interest in the questions of family relationships has been connected with the fact that the Systematic Section of the Brooklyn Botanic Garden is laid out approximately by the Engler system. Most adjoining families in our Garden resemble

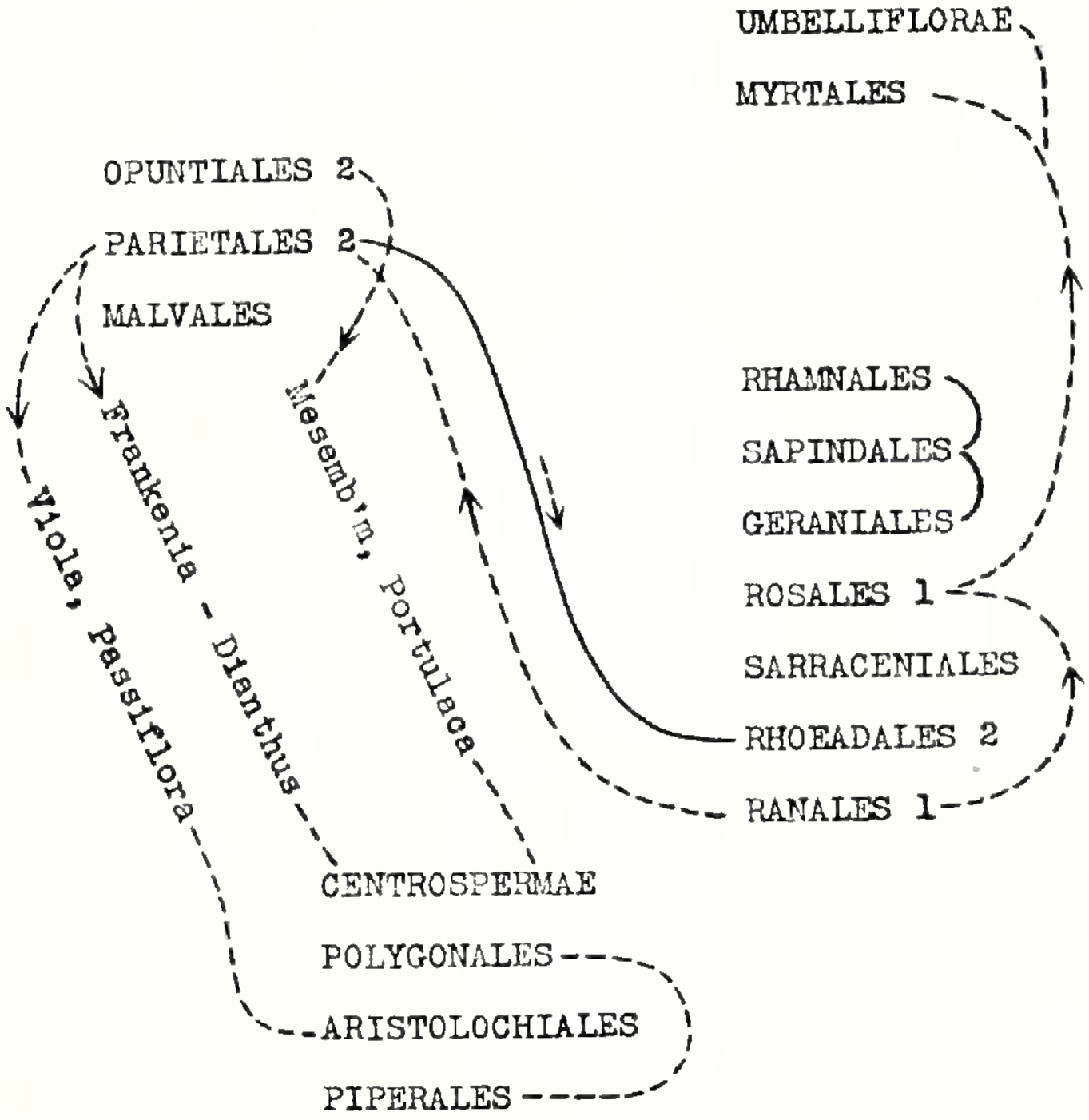


FIG. 8. Orders of Dicotyledons (in part), after Engler, with lines showing possible additional relationships. ———, lines from Engler 1897 diagram, – – –, Additional lines: 1, Groups with separate or single carpels; 2, Groups largely with parietal placentation, remaining groups mostly with axile or central placentation. (10,389)

one another to some extent, though in some instances, for example Aristolochiaceae, this is definitely not the case.

Herbarium Research and Field Work

BY HENRY K. SVENSON

Early in the year an account of the vegetation of Middle Tennessee was published in the Journal of the Tennessee Academy

of Science, also as a Contribution of the Brooklyn Botanic Garden, and was illustrated with plates drawn by Miss Maud H. Purdy. This area, and especially the region centering on Coffee County, is remarkable for the great number of plants characteristic of the Atlantic coastal plain, which in many instances are not found elsewhere in the interior. Much of this interesting area is now occupied by Camp Forrest, a situation which will undoubtedly change the natural character of the vegetation in

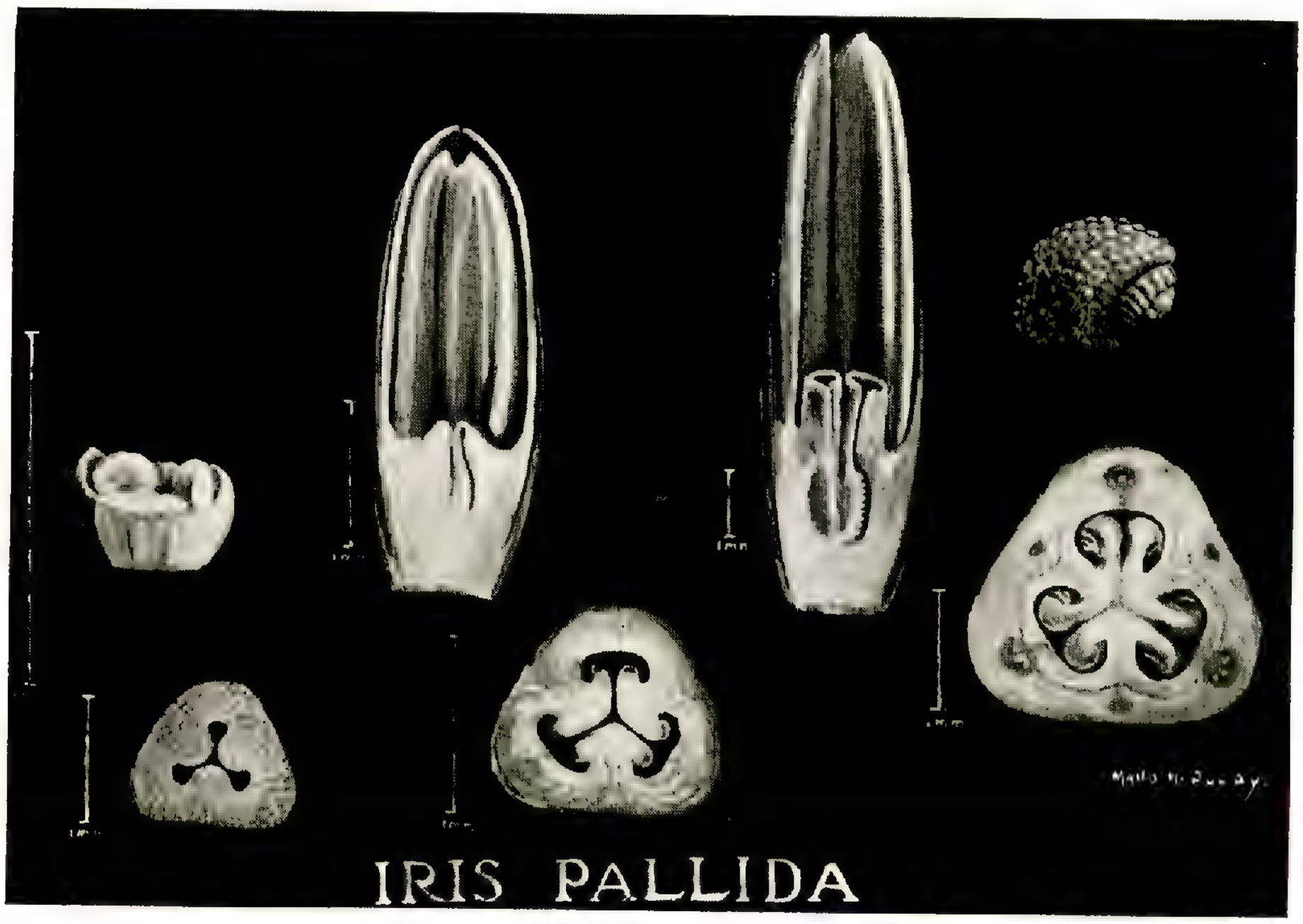


FIG. 9. *Iris pallida*, showing ovary one-celled in bud, three-celled in flower (10,208)

the future. In this Tullahoma area of Middle Tennessee are found *Gaylussacia dumosa* (a dwarf huckleberry of coastal bogs), *Scleria reticularis* (a sedge local in pine-barrens from Massachusetts to Florida, and otherwise only on the dunes of northern Indiana), *Rhynchospora macrostachya* of closely similar distribution, *Lycopodium alopecuroides* (the largest of our pine-barren species), *Drosera brevifolia* (a purplish-flowered sundew), *Potamogeton pulcher* (one of the pondweeds known previously inland

at St. Louis, Missouri), and many others. The presence of so many of the coastal plants in the barrens of Middle Tennessee, and the ancient character of the underlying rock in comparison with the recent sediments which compose the coastal plain, seem to indicate that this upland area has been a point of origin of plants of the coastal plain. Some of these coastal plants, such as *Eleocharis microcarpa*, occur here and there in siliceous areas north to central Indiana, and other species extend to the dunes of Lake Michigan. These siliceous areas perhaps depict the remnants of larger areas which were eroded, but even in the present state they might well represent the transition points in the migration of a flora from the coastal plain to that of the Great Lake dunes through the uplands of Alabama, Tennessee, and Kentucky.

The month of August I spent at Peacham, Vermont, which is only thirty miles from the Canadian border. Material was collected for the herbarium. This area has long been known as one of our northernmost outposts of *Rhododendron maximum*, which has its greatest abundance in the Alleghenies.

In January, 1941, with the financial assistance of the John Simon Guggenheim Memorial Foundation, I set sail for Ecuador. My trip was originally scheduled for December, but due to unavoidable circumstances, I could not leave until the end of January. This exploration trip, as explained in the last Annual Report, was carried out for the purpose of tying in the relationship of the vegetation of the Galapagos Islands and the coast of Ecuador and Peru. The Galapagos have figured very prominently in discussions of the species problem, yet little or no attention has been paid to the desert areas of the continent from which a large percentage of the Galapagos plants have undoubtedly been derived. I found the climate and the general aspect of the vegetation to be very similar on the coast of Ecuador and Peru to that of the Galapagos Islands, and I also found an additional number of species which were supposed to be confined to the Galapagos group. Most of these are desert plants which

occur on the exposed headlands of the littoral and under similar conditions in the Galapagos Archipelago, such as species of *Oxalis*, *Euphorbia*, *Tribulus*, and *Luffa*. I was fortunate in spending an entire rainy season on the coast of Ecuador, but my progress was somewhat hampered by the unexpectedly high precipitation in an "off year." Approximately six inches of rainfall was anticipated along the Ecuadorian coast at Salinas during the period from January to the end of April, the extent of my stay. There was, however, a deluge of twenty inches, which increased inland. Such an unprecedented precipitation occurred southward along the western flank of the Andes, even as far as Lima, Peru, and made travel almost impossible during extended periods. As a consequence, I was unable to get into the low mountains along the Ecuadorian coast; now that means of access are known I hope to complete such exploration in a succeeding year. The material which I collected shows that there is a well-marked province of plant geography comprising the northern coast of Peru, the southwestern coast of Ecuador, and the Galapagos Islands. An extended account of exploration and a catalogue of the plants with their Galapagos connections will be published during the coming year.

Genetics

Variation in Nephrolepis

Problems in the variation of certain native fern species

By Ralph C. Benedict

The collection of *Nephrolepis* variants has been maintained during 1941 in the public and experimental greenhouses. This material offers a considerable number of research problems in addition to those so far reported. From time to time, requests from other institutions for representative sets of these variations and species are filled.

Beginning about forty years ago, when essential agreement had been reached regarding the delimitation of our native hardy

fern species, the interpretation of occasional collections, intermediate between recognized species, as hybrids, came more and more into acceptance in the United States and in Europe. The greatest number of these putative hybrids were found in a section of the genus, *Dryopteris*, but ascription of hybrid identity has also been made in *Asplenium*, *Camptosorus*, and other genera, including, most recently, *Osmunda*.

Latterly a number of developments have occurred which have raised interesting questions both regarding these presumptive hybrids and about the range of variation and differentiation among the fern species involved. Increased collections over wider ranges have indicated that the limits formerly assigned to some of our species must either be extended, or that subdivisions of these species will have to be made. For some of these possible subdivisions differences of opinion have arisen as to whether certain types are to be interpreted as hybrids or as distinct species or in lower categories. Furthermore, some of the best attested of the hybrids have been found to manifest spore fertility and to reproduce themselves true to spores, a state not noted in connection with any of the more extensive earlier studies.

Altogether, these ferns offer a series of challenging problems not only in identification and classification, but also for an experimental attack on the basic factors involved. At present, the outdoor culture under approximately uniform conditions of recent collections is being carried on under slat shade in the experimental grounds. Field trips and correspondence have added to the collections including a few plants from outside our local range.

Economic Plants

By Ralph H. Cheney

The subjects of investigation, during 1941, have been as follows:

1. A study of the drug-producing trees of the Pacific coast.
2. Pharmacological effects of the volatile oil derived from *Umbellularia californica* Nutt. (myrtlewood), of Oregon.
3. Histo-pharmacological effects of caffeine upon the cardiac tissue of the turtle was begun.
4. Comparison of the topography, purposes, and activities of Pacific coast and Atlantic seaboard botanic gardens was made.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1941

To the Director:

I submit herewith the report of the work of this department for the year 1941.

Attendance

Grounds.—The number of visitors to the Garden, as recorded by the turnstiles at the five entrance gates during 1941, was 1,753,331, a considerably larger figure than that of last year, 1,687,564, but not as large as that of 1939, 1,798,029. With the exception of that year the attendance in 1941 was the largest ever recorded at the Garden.

Monthly attendance.—In two of the months the attendance exceeded all previous records. These were May, with a total of 335,455 visitors, and August -168,882. The largest previous figure for May was in 1938—331,095, and for August, in 1940—162,907.

Week-end attendance.—53,458 persons visited the Garden in the week-end May 3–5, a slightly higher figure than the number on May 11–13 of the previous year, namely, 52,796; but the figures have never reached the total for April 30–May 1, 1939—56,145. However, the attendance for several successive week-ends in the latter part of April and early May was very large, due, probably, to the good weather and the early blossoming of many of the

flowering shrubs and spring flowers. The figures for these week-ends are as follows:

April 26–28	42,119
May 3–5	53,458
May 10–12	30,408

For these three week-ends, therefore, the total attendance was 125,985 persons.

Conservatory attendance.—Because the conservatories were closed for repairs from July 7 to October 18, the attendance figure for the year is necessarily much lower than usual, namely, 107,608, as against 146,643 in 1940.

Classes and lectures.—The combined attendance at classes and lectures to children and adults at the Garden was 116,386, as against 108,368 in 1940 and 104,312 in 1939. The following table shows other attendance data.

ATTENDANCE AT THE GARDEN DURING 1941

	Jan.	Feb.	Mar.	April	May	June	July
At regular classes. .	616	963	2,626	3,363	3,251	3,265	8,000
At visiting classes. .	812	373	847	11,151	17,525	9,869	75
At lectures to children.	435	363	840	7,882	3,750	7,701	0
At lectures to adults	90	510	174	202	168	220	0
At conservatories. .	6,594	7,181	13,030	27,918	22,623	8,161	1,719*
At grounds.	64,537	66,974	99,331	335,455	249,099	165,899	155,955

	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes.	7,500	1,616	3,856	4,980	2,662	42,698
At visiting classes.	0	75	8,459	4,596	1,906	73,688
At lectures to children. .	0	28	4,687	2,414	1,006	29,106
At lectures to adults. . .	0	0	160	0	13	1,537
At conservatories.	0	0	5,294*	8,878	6,210	107,608
At grounds.	168,882	153,728	130,093	109,631	53,797	1,753,381

* Conservatories closed July 7 to October 18.

STATISTICS OF SCHOOL SERVICE

	1940	1941
Loan Lectures (Lantern Slides, etc.)		
No. of sets lent	15	14
No. of teachers involved	28	41
No. of pupils attending	1,975	2,825
Material Supplied		
Total number of requests from schools	1,020	651
Number of different institutions	310	235
High Schools and High School Annexes		
Brooklyn (Total No. 49)	24	23
Queens (Total No. 28)	12	10
Manhattan (Total No. 54)	14	9
Other Boroughs (Total No. 31)	10	10
Junior High Schools (Total in Brooklyn 31)	8	6
Colleges and Universities (Total in Brooklyn 7)	11	12
Elementary Schools		
Brooklyn (Total No. 236)	171	85
Queens (Total No. 145)	7	11
Manhattan (Total No. 124)	7	8
Other Boroughs (Total No. 148)	2	16
Private and Parochial Schools	19	17
Other Institutions	25	28
Number of potted plants for nature study	4,130	1,736
Number of Petri dishes filled with sterilized agar	552	594
Total number of teachers supplied with material	10,230	6,781
Total number of pupils reached	448,883	304,003
Living Plants Placed in School Rooms		
No. of schools	35	23
No. of plants	588	578
No. of teachers involved	1,287	942
No. of pupils reached	45,264	33,345
Plants Distributed (Raised in Classes)	40,633	44,567
No. of persons taking plants	1,535	1,880
Total number of schools represented	156	139
Seed Packets for Children		
No. of schools	681	658
No. of teachers	8,160	8,792
No. of pupils	325,023	351,719
No. of packets	975,072	1,055,158
Exhibits Provided		
No. of exhibits [1]	8	4
Viewed by	152,685	123,100

[1] Not including five exhibits installed at the 1940 World's Fair, which were, of course, viewed by uncounted thousands.

Adult Courses

There were 996 persons registered for adult courses during 1941, not as many as those in 1940 (1359) but more than in any other year of the Garden's history. A free course of 3 exercises offered in 1940 to teachers brought 500 registrants, and this was largely responsible for the large 1940 figure.

The largest registration in these adult courses was in D1, Medicinal Plants, a course for students in nurse training schools of hospitals. 232 young women registered for this course, 36 in the spring and 196 in the fall, coming from four Brooklyn hospitals: Jewish, Kings County, Prospect Heights, and St. Johns. This course was first offered by the Garden in 1927, so that this was the 15th consecutive year that it has been given. No fee is charged.

Courses given by members of this department. –The following shows in tabular form the courses given by members of this department in 1941, with the registration.

No. of Course	Name of Course	Instructor	Regis.
A11 and A13.	Wild Flowers and Ferns; Spring and Fall	Miss Rusk	28
A14.....	Fall Wild Flowers	Miss Rusk	10
A15.....	Native Ferns	Miss Rusk	20
A5 and 9, B13 and 14.....	Trees and Shrubs; Spring and Fall	Dr. Graves, Miss Ashwell	63
A22.....	Trips to the Tropics	Dr. Graves, Miss Rusk	40
A44.....	Walks and Talks in the BBG, Spring and Fall	Dr. Graves, Miss Rusk, Miss Ashwell	49
B10.....	Flowering Plants and Ferns, Field and Lab.	Miss Rusk	16
D2.....	Trees and Shrubs (for Park Dept. Spring only)	Dr. Graves, Mr. Doney	22
D1.....	Medicinal Plants; Spring and Fall	Dr. Graves, Miss Rusk, Miss Ashwell	232
		Total registration	480

New courses.—In order to afford an opportunity to members and others, who are busy during the day, to attend our outdoor classes, Miss Rusk offered a course of 3 exercises on Monday evenings in the fall, on native ferns, holding it in our wild flower garden. The hours for this were from 6:30 to 7:30 p.m. It is a pleasure to report that 20 people registered for the course, the

attendance for the 3 sessions being 53. This response suggests the need of more evening, outdoor classes of this sort, which cause little inconvenience and expense in connection with opening the building (except for registration at the first exercise). For a similar class in native wild flowers scheduled for Tuesday mornings at 10:45, and held likewise in the local flora area, 10 people registered.

In this connection the course of 3 illustrated lectures, offered by Dr. Gundersen in March, should be mentioned. The title of the course was "Conifers around the World," for which 60 people registered. No fee was charged.

Flower Days

Two flower days for members of the Garden were observed in 1941 as follows:

1. *Fourteenth Annual Rose Garden Day, Tuesday, June 10.* Members and guests met in the auditorium at 3:30 p.m. Mr. Montague Free, Horticulturist, and Mr. S. R. Tilley, Rose Grower, conducted an informal discussion on problems of rose culture. After the usual tour of the Rose Garden, tea was served in the rotunda of the Laboratory Building, the Woman's Auxiliary, assisted by young ladies of the staff, having charge of the social arrangements.

2. *Fall Rose Garden Day, Tuesday, October 14,* was a similar occasion, at which we were fortunate in having Mrs. Charles Doscher, Vice President of the Long Island Horticultural Society and the Vice President of the Federated Garden Clubs of New York State, speak on "A Long Island Rose Garden."

Arrangements had been made for two other flower days, which were abortive on account of conditions beyond our control. Lilac Day had been scheduled for Tuesday, May 20, 1941, but because of the unusually warm weather during the first half of May, the lilacs were far ahead of their schedule, and, incidentally, of ours, too. To have held the exercises on the date scheduled would have been to exhibit only the tag-end flowers of our beautiful collection. The event was therefore cancelled.

An Herb Garden Day had been projected for September 30, with a lecture by Miss Winifred M. Graville, F.R.H.S., of Sheffield,

FIG. 10. Knot Gardens in the Herb Garden: Sweet Violet (*Viola odorata*), Lavender Cotton (*Santolina*), Germander (*Teucrium Chamaedrys*). Surrounding the Knots are Culinary and Medicinal Plants, segregated. (10,317)

England; but on account of the international situation it was impossible for Miss Graville to secure passage to this country. And so this affair, likewise, was cancelled.

Publicity

In 1941, 70 typewritten pages of letter head size of news releases, containing 54 articles telling about events at the Garden, such as courses, lectures, flowers in bloom, flower days, and research in plant life, were mailed to various metropolitan papers at irregular intervals throughout the year. Because of mounting cost for clippings, and the ever-increasing need of economy on the part of the Garden, we have discontinued, as of November 1, our subscription to a clipping bureau. There is, however, every indication that the publicity the Garden receives through this means is being maintained.

Through the cooperation of the School Nature League, located at the American Museum of Natural History, New York City, a mimeographed slip telling about our Wild Flower Garden (Local Flora Section) was sent to about 1500 subscribers to the Bulletin of the League. This slip was enclosed with the League's Bulletin on Autumn Wild Flowers, by Ada Kneale Burns, issued in September.

Circulars of early spring courses in February and March, of regular spring and fall courses, schedules of radio talks, cards announcing Dr. Gundersen's course of lectures in March, invitations to Flower Days, and the annual Prospectus of Courses, were prepared, printed, and mailed, through this department, as usual. Post cards were mimeographed and mailed to members of the Garden, as follows: (1) on April 4, announcing crocuses and other spring flowers in bloom outdoors; (2) on April 23, telling of the display of cherry blossoms, and (3) on May 15, advising members of the distribution of chrysanthemum seedlings and cuttings, and seedling annuals.

Miscellaneous Items

A considerable portion of the working hours of the members of this department was occupied with the docentry of garden clubs, school classes, science clubs, and various other organiza-

tions. Likewise, the "Bureau of Information" accounts for a sizeable part of our time. *The Brooklyn Botanic Garden Scholarship* for Brooklyn College was awarded to Mr. Robert Gottlieb. This enables a student of the College to elect one of our courses. Mr. Gottlieb elected our fall course in Trees and Shrubs.

Exhibit of the week posters were displayed on the grounds from April to December, eight new subjects being added, as follows: star magnolia, *Magnolia stellata;* white oak, *Quercus alba;* Japanese styrax, *Styrax japonica;* golden-rain tree, *Koelreuteria paniculata;* fleece vine, *Polygonum Aubertii;* water lilies, *Nymphaea* spp.; castor bean, *Ricinus communis;* and chrysanthemums.

Forsythia for Brooklyn.—We continued our cooperation with the Forsythia for Brooklyn movement of which Mrs. Edward C. Blum is secretary, by issuing, early in April, news releases to all metropolitan papers explaining the movement, telling of the early history of the forsythia, and describing the various species, particularly those best fitted to serve as ornamental shrubs.

Clerical assistance.—After July 1, the assistance we have been receiving through the WPA terminated. This left gaps in our personnel which have meant a considerable amount of overtime work on the part of the regular staff. In this connection we should like to acknowledge our indebtedness to Mrs. Herbert Lawrence, of Brooklyn, who again contributed her services for part time work throughout the year.

Lists of birds seen in the Brooklyn Botanic Garden have been posted on the bulletin boards on the grounds throughout the year —in spring and fall at least twice a month; in winter and summer, at longer intervals. These lists were kindly furnished us, as usual, by Mr. Bernard P. Brennan, a member of the Brooklyn Bird Club, and formerly its president. We are much indebted to Mr. Brennan for this valuable service.

Personnel.—Miss Rusk has continued to serve as Librarian and Curator of the Herbarium of the American Fern Society. I served on the Council, on various committees and as associate editor of the Bulletin, of the Torrey Botanical Club. I continued to serve as editor of the Brooklyn Botanic Garden Leaflets, and Contributions, and as editor of the Plant Section of General Biology for Biological Abstracts. Also, as usual, I served as

examiner for merit badges for the Brooklyn Council of the Boy Scout Foundation of Greater New York.

The annual meeting of the "alumni" (now numbering well over 1,000) of our outdoor courses on trees, shrubs, and herbs was held on Saturday afternoon, January 4, in the Laboratory Building. Mr. Rutherford Platt of the Platt-Forbes Co. of New York City, and one of our former students, gave another of his delightful, informal talks, illustrated with some of his new color photographs and enlargements. Mr. Platt is an occasional contributor of colored photographs of plant material and articles thereon to *Life* magazine. He declares that the courses he has taken at the Brooklyn Botanic Garden are the source of his inspiration.

I devoted the period June 15 to August 1 and also several week-ends to breeding work with chestnut species and hybrids at Hamden, Conn. From June 15 to July 14 Miss Rusk assisted me in this work. A brief resume of the results will be found on pages 94–99.

Respectfully submitted,
ARTHUR HARMOUNT GRAVES,
Curator of Public Instruction.

REPORT OF THE CURATOR OF ELEMENTARY INSTRUCTION FOR 1941

TO THE DIRECTOR:

I hereby present my annual report for the Department of Elementary Instruction for 1941.

It might be of interest to review rather explicitly the year's work which ends a long period of progressive upbuilding. It has been a banner year in certain ways. The attendance in visiting classes and at children's lectures was considerably larger than last year, and perhaps our most outstanding achievement is that of passing the million mark in the distribution of packets of seed to children. Almost a million and a quarter packets were filled during the year, nearly half of that number being filled by the children of our own garden classes. More than 1,055,000 were distributed to schools.

The number of plants distributed to schools has dropped somewhat because of a price being placed upon these collections. Also the amount of nature material distributed has been slightly reduced because considerable material has been given out through the American Nature Study Society at the Nature-Garden Office of the Board of Education.

Through all our avenues of work with the elementary schools in this Borough we have come in contact this year with 98% of the schools, a record number.

A few less than 2,000 people have been instructed in our greenhouses, not just entering for demonstrations.

A comprehensive view of the work of this Department might be taken in the high spots of the twelve months of the year.

In the month of January all the machinery is set in motion to publicize the seed work. During the year 490 elementary schools, 49 high schools, 1 college, 17 private and parochial schools of the city, and 39 other institutions sent in their orders. Three lots of bulk seed were sent to England and Finland in addition to 1,022 packets being given away here.

In January some of the members of the Department have their previous year's vacations.

All of the printing and work connected with classwork for the spring is attended to this month.

Groups of Girl Scouts came on Saturday mornings for instruction in garden work.

In the month of February a group of older children returned to the Garden to work on the plan for the annual flower border. The plan was not only worked out by them under supervision, but later the seedlings were started in the greenhouses and most of the pricking was done by them. During this time Miss Hammond taught a group of students in Camp Nature Counselor Work, also on Saturday mornings.

One WPA teacher, Mr. Victor Berwisht, was trained by our Department to give general help in our classes and to serve as docent.

At this time teachers' classes for the new term register. The class in Elements of Horticulture, spoken of in the *Prospectus* as B3, was so large in 1941 that two sections had to be formed for the spring term.

FIG. 11. "Fun with the Microscope." One of the Winter Activities for Boys and Girls. In background trunk of *Pinus palustris* tapped for turpentine. (10,370)

The Department of Elementary Instruction cooperated with the Board of Education in Mr. Marvin M. Brooks's course in Nature-Garden Science held at the Garden for the Borough of Brooklyn. A similar course given under the auspices of the Staten Island Teachers Association was given by Mr. Brooks, with one member of our staff, Miss Miner, taking part. The Department also cooperated with the Brooklyn Teachers Association in Miss Matilda Rogers's classes in Flower Arrangement, both spring and fall.

In March, 164 children registered for our Saturday morning classes, and 48 new students were admitted in what is called the "Try-out" class. A few others were taken in in May, thus making a total of 217 children ready for the spring garden. The work of these Saturday classes through the spring centers around the plans for the outdoor garden.

The visiting class program during the months of March, April, May, and June was, as usual, heavy, with an extra number of classes coming under WPA guidance.

All through the spring and fall the nature material collected by Miss Hammond is given out at different times to Nature Rooms and class teachers. During the summer 1,000 wild flower specimens, several thousand tree leaf specimens, a few hundred ferns and other spore-bearing plants were collected, sorted, and a large part mounted by Miss Hammond.

Through the distribution of study material and plants, nearly 7,000 teachers were assisted in their work, and over half a million children.

In the busiest time of our year, the NYA help was taken away, leaving a tremendous amount of work to be done in our greenhouses. Later in the year Mr. Joseph LaGrutta volunteered his services and has been helping three days a week in the setting up of greenhouses and the shifting of material. No new stock material has been bought this year. It has been a year of strict economy in material and supplies.

At the close of the heavy teaching season, the children's garden takes its place, and although the work has been going on every Saturday in the spring, summer seems to be the real garden time.

Total registration for garden classes was 235. This, of course,

drops appreciably as the summer goes on, and midsummer registration was 149, accounted for by the number of children going to camps and summer homes. Most of the children, except new-comers, made their own garden plans, a larger percentage doing this than ever before. As usual, our tomatoes became the bumper crop, for more than a ton of fruit was raised. Corn was again tried in the garden. It is always a favorite crop, but prone to have borers. Our picking garden, the project of the high school group, was a mass of continuous bloom. The children were taught proper flower arrangements, good color combinations, and had the satisfaction of enjoying the results of their labors, for over 150 flats of seedlings were raised by them for the flower beds. During the summer a series of talks on botany was given in the garden to prepare the children for their honors.

So went the summer. During the fall of the year an intensive round of teachers' and children's classes goes on just as in the spring. Each year this Department offers some short free course for the teachers of the Borough. Last year such a course was given in the fall, two lessons in classroom Nature Study, with material supplied. Over 100 teachers attended and received material for their classwork.

There are one or two points of interest that stand out in this year and which might be held in mind. First, no mention has been made of a project carried on by our children for the past two years. There is a small village in England called Northbourne, about three miles outside of Deal, in County Kent. Here about a hundred children between the ages of five and fifteen have become the friends of the children of the Saturday morning classes here at the Garden. In 1940, £15 were sent there for a Christmas treat for those children; this year £20 and also two large boxes of clothes were given. It seemed to us, the Department and the children, that the nicest thing we could do for our young English friends was to give them a good time. We shall hope to continue this throughout the war just as we helped support a French orphan during the last war.

The Town Hall Leadership School held one meeting at the Botanic Garden to observe our educational methods of work with children. A number of universities from the Midwest

were represented in this conference, such as the University of Michigan and the University of Wisconsin.

A very beautiful Pompeian marble birdbath was presented to the children's Garden in memory of Miss Bertha Lancaster, an old student and friend of ours. The gift was made by her three sisters in loving memory. It has been set in a permanent foundation at the center of the formal bed directly north of the Garden House in the formal garden.

A leave of absence for three months—October, November, and December—was given to Miss Miner for further study. Miss Edson has substituted in her absence.

Miss Miner was elected a second time to the Presidency of the Garden Education Department of the National Education Association at their meeting last June. She also represented them at the National Defense Garden Conference held in Washington in December.

Miss Hammond still serves as one of the Vice Presidents of the New York Chapter of the American Nature Study Society.

During the months of July and August Miss Carroll again served as one of the Directors of the Southern Art Conference at Blue Ridge College, Blue Ridge, N. C., as she has for the last few years, and also repeated her course in Art Appreciation at the College.

I continue to serve as Secretary of the National Plant, Flower & Fruit Guild, and one of the Directors of the School Garden Association of New York City.

It has long been in our minds to prepare booklets concerning the different phases of the work of this Department, its Children's Garden, its Educational Greenhouses, its Visiting Classes, its Saturday Morning Classes, and the educational principles upon which all these things have been based. The first booklet, "Our Pattern," was published this year; the others are to follow. It has been published in answer to many requests and in the hope that those reading it may feel the value of this type of work for boys and girls.

Respectfully submitted,

ELLEN EDDY SHAW,

Curator of Elementary Instruction.

REPORT OF THE CURATOR OF PLANTS FOR 1941

To the Director:

Herewith I submit my report for the year 1941:

Lilacs

For a number of years I have been occupied with our numerous lilac varieties during their flowering time. A Guide to Lilacs in the Garden (Guide No. 12) was published in the July *Botanic Garden Record*. Mr. John C. Wister added a note on twenty-two additional varieties, Dr. Gager and Dr. Ernst Ohlsson wrote on lilac odors, Mr. Montague Free on Lilac Cultivation and Propagation, and Dr. George M. Reed on Insect Pests and Fungous Diseases. In my part, on Lilac Species and Varieties, they were classified in eighteen groups, four for the species, two for hybrids of species, two (singles and doubles) for white varieties of *Syringa vulgaris*, and ten groups for its colored varieties.

Just what is the difference between "Bluish lilac," "Pinkish Lilac," and just "Lilac"? Mrs. McKelvey, in *The Lilac* (1928), has given detailed color notes, for example; Madame Antoine Buchner: "Tone pale; color in bud Deep Brownish Vinaceous to Purplish Vinaceous (XXXIX) to Laelia Pink (XXXVIII); when expanded Laelia Pink (XXXVIII) on white without, Pale Lobelia Violet (XXXVII) on white within;" the figures refer to Ridgway's Color Chart. Such distinctions are not easily remembered for a hundred varieties. Individual clusters change color greatly within a few days, Mr. Wister states that color also varies with climate.

It would be a great aid in distinguishing varieties to have available a color chart on a single sheet. Perhaps fifteen or twenty colors, numbered, would suffice for most purposes; for any given plant the bud or the expanded flower could be assigned to its nearest color number. With color so uncertain, I have given some attention to lilac flower forms. A similar method was recently used by Mr. H. G. Seyler in the Farr Nursery Lilac List.

Trees

Since September I have been occupied with the trees in the Garden. With the cooperation of Dr. Gager, Dr. Graves, Dr. Reed, and Mr. Doney, a Guide to the trees in the Botanic Garden (Guide No. 13) was prepared and published in the January, 1942, Record. We have about 130 genera of trees with more than 500 species now growing in the Garden; of these about 100 are Conifers. Genera of which we have ten or more species represented are willow, poplar, birch, oak, magnolia, apple, prunus, maple, and ash. Dr. Reed reports that we have about 18 varieties of Japanese flowering cherries. With many of our trees yet small we still have room for them. In future years it will be increasingly a question which trees to eliminate in order to have room for the most desirable ones.

Shrubs

Mr. Doney reports that the collections of trees and shrubs have been augmented—new species added and old declining plants replaced. Among the new plants were *Actinidia chinensis*, *Deutzia Veitchii*, *Magnolia cordata*, and *Daphne mezereum* var. *alba*. Many groups are now occupying all their space and we must plant new species on the border mound or elsewhere or limit ourselves to the most distinct forms. Many new labels were placed; petty vandalism, combined with carelessness, makes labelling a constant problem. Hanging wooden labels have not proved satisfactory on shrubs with numerous, thin branches, such as Spireas; in these cases we are returning to the use of upright metal labels.

In October Mr. Doney spent a week at the Arnold Arboretum, studying shrubs with particular attention to Barberries, Crab-apples, and Junipers. Some of their genera, such as *Tripetaleia*, *Ostryopsis*, and *Pyracomeles*, we do not have; we hope to add them to our collection soon. Mr. Doney collected seed of several uncommon species, particularly of *Berberis* and *Aesculus*.

Part of our nursery was replanted and the space between rows increased so the rototiller could be used for cultivating. We have about 700 shrubs in the nursery now, including about 100 species and varieties not yet on the grounds.

Herbaceous Plants

The absence or delay of Seed Catalogs from foreign countries made it difficult to obtain seeds of a number of plants wanted. Some species were added to the Rock Garden from American nurseries.

Classes

During the spring I conducted outdoor classes on "Plant Families" and "Lilacs in Flower." Mr. Doney gave courses on "Ornamental Shrubs" in spring and fall.

Statistics Relating to Living Plants

	Species or Varieties	*Plants*
Living Plants Received:		
By collection	17	68
By exchange	185	505
By gift	228	712
By purchase	90	216
Total	520	1,501

Seed Exchange

Seed Packets Received:	
By collection	2
By exchange	84
By gift	63
By purchase	96
Total	245
Seed Packets Distributed:	
To members	
By exchange	10
By gift	20
Total	30
Plants and Cuttings Distributed:	
Special distribution to Members May 23	13,940
To members during year	56
By exchange	255
By gift	462
Total	14,713

Iris Collections

Dr. George M. Reed reports that the following were received by exchange:

Bearded Iris

Mr. F. W. Cassebeer, Nyack, N. Y.	57	varieties
Mrs. Thomas Nesmith, Fairmount Gardens, Lowell, Mass.	28	"
Mr. Howard R. Glutzbeck, Lynbrook, L. I., N. Y.	3	"
Mr. J. B. Lightfoot, Orange, Conn.	3	"
The Longfield Iris Farm, Bluffton, Ind.	11	"
Mr. Clint McDade, Chattanooga, Tenn.	63	"
Mr. W. J. McKee, Worcester, Mass.	25	"
Mr. H. P. Sass, Midwest Gardens, Elkhorn, Neb.	23	"
Col. J. C. Nicholls, Ithaca, N. Y.	12	"
Mrs. L. W. Kellogg, Over-The-Garden-Wall, North Granby, Conn.	17	"
Mr. Robert Schreiner, Schreiner's Iris Gardens, St. Paul, Minn.	30	"
Mr. Kenneth D. Smith, Dongan Hills, S. I., N. Y.	26	"
Mrs. Chester A. Swift, San Marino, Cal.	2	"
Mrs. F. P. Walther, Presby. Memorial Garden, Upper Montclair, N. J.	64	"

Japanese, Siberian, and miscellaneous species

Mr. W. H. Dole, West Orange, N. J.	4
Mr. J. B. Lightfoot, Orange, Conn.	1
Mr. W. A. Payne, Terre Haute, Ind.	2
Dr. R. C. Scott, East Orange, N. J.	1
Mr. Kenneth D. Smith, Dongan Hills, S. I., N. Y.	1
Mrs. F. P. Walther, Upper Montclair, N. J.	3

Labels and Signs

Labels and signs were made by Mr. John McCallum as follows:

Small galvanized labels for herbaceous beds and for Rose Garden fence.	206
Large galvanized labels for herbaceous beds	46
Lead labels for woody plants	171
Wood labels for Roses, Iris, etc.	320
Wooden signs	54
Cardboard signs	225
Wooden hanging labels for trees and shrubs	273
Total	1,295

Also numerous miscellaneous numbers and signs.

Respectfully submitted,

Alfred Gundersen,
Curator of Plants.

REPORT OF THE HORTICULTURIST FOR 1941

To the Director:

I submit herewith my report for the year ending December 31, 1941.

Personnel

The number of men on the gardeners' and laborers' payroll was still the same as for the past twelve years—9 on the monthly payroll and 14 per diem men.

Student Observers

Three young men, Frank Ganz, Richard Snyder, and Albert Swanson, worked as student observers for a total of 217 days without pay (180 days more than in 1940).

Labor paid for by Government relief organizations

Works Progress Administration

Gardeners (4) ..... 333 days 2,661½ hours
(157 days less than in 1940)

National Youth Administration

5 youths ..... 750 hours
(10,770 hours less than in 1940)

Systematic Section

Five metal drums were sunk in the Polygonaceae bed to restrict invasive tendencies of strong-growing polygonums.

The Crassulaceae bed was remade with new soil and new plants.

Horticultural Section

The careless disposition of a cigarette butt was, we think, responsible for a fire in the winter covering, which destroyed one large (about 6 ft. x 8 ft. x 5½ ft. high) and two small (about 3 ft x 5 ft. x 2½ ft.) Box bushes. These were replaced by new bushes of similar size at a cost of $180.

Rose Garden

Twenty-seven standard ("tree") roses, in seven varieties, were planted in the Rose Arc.

Replacements in Rose Garden ..... 177 plants.
New varieties (24) ..... 191 plants.

FIG. 12. Ivy Garden (forms of *Hedera*). Portion of Gold Medal Exhibit at International Flower Show, 1941. (10,252)

For the above rose plants we are indebted to Bobbink & Atkins, Rutherford, N. J., 317 plants; Jackson & Perkins Co., Newark, N. Y., 37 plants; and Wayside Gardens Co., Mentor, Ohio, 14 plants.

Ivy Garden

As an aftermath of our exhibit at the International Flower Show, 56 species and varieties of *Hedera* were planted on Boulder Hill to form an Ivy Garden covering 2,000 square feet. Labels for each variety were also made and placed.

Medicinal and Culinary Herb Garden

The knot gardens were, in part, remade and, in accordance with medieval practices, the interspaces were covered with colored material—in this case yellow, pink, and black achieved by use of sand, flowerpot chips, and pea coal.

Medicinal plants were regrouped to facilitate their use as a teaching collection.

In view of the foreseen shortage of seeds of some herbs and drug plants, we collected as many seeds as possible in these groups. As a result we were able to supply a Botanic Garden Member with belladonna seeds for cultivation on a fairly large scale; and the remaining seeds are to be used to augment our collection by exchange with dealers.

Miscellaneous

Four new beds each 450 feet long by 8 feet wide (14,400 square feet in all) were constructed on the Esplanade. These were planted with 76 flowering cherry trees of the variety Kwanzan, and 3,924 plants of bearded iris, in 282 varieties.

About 630 feet of irrigation pipe was laid to supply 11 new faucets—mostly on the Esplanade.

To protect the new Esplanade plantings, Rock Garden, Ivy Garden, etc., 3,900 lineal feet of chain link fence was erected. Private funds were contributed by a friend of the Garden to meet the cost of the fencing.

At last time was found to install the concrete-post and metal-rail fence, designed by Mr. Caparn, our Consulting Landscape

Architect, across the north end of the Rose Arc. The forms were made and the posts were cast in 1936 by our own men.

Almost 1,000 square feet of flagstone walk were relaid on Boulder Hill and in the Rock Garden.

About 28,800 square feet of walks were resurfaced with cold laid bituminous pavement by the Works Progress Administration under the supervision of Park Department engineers. As a corollary, 3,800 feet of turf, edging the walks, was relaid. Considerable pruning of trees and shrubs bordering the walks was necessary to allow the manipulation of the automotive roller.

Exhibits

At the International Flower Show in March we installed an "Ivy Garden" which was awarded two gold medals. The citation accompanying one award reads: "The Garden Club of America Bulkley Medal in gold awarded for artistic, horticultural, and educational achievement to the Brooklyn Botanic Garden."

A *Leaflet* [1] describing the exhibit was prepared and distributed at the Show.

Seed and Plant Distribution

The International Seed Exchange was temporarily discontinued, now for the second year, on account of the international situation.

Living plants distributed:

To Members, on May 23rd 13,940

Cooperation with Other Institutions

We contributed cuttings of 60 varieties of *Hedera* to the Department of Floriculture and Ornamental Horticulture of the New York State College of Agriculture at Cornell University and supplied additional cuttings later in the year.

More than 70 cuttings and plants of *Hedera* in 15 varieties were sent to Prof. Victor H. Ries, Agricultural Extension Service, University of Ohio.

[1] The Brooklyn Botanic Garden exhibit of an ivy garden together with a collection of more than seventy species, varieties, and forms of Hedera. International flower show, March 17th to 22nd, 1941. *Brooklyn Botanic Garden Leaflets*. Ser. 28. No. 1–3. March, 1941.

Upwards of 150 plants were given to be placed in the Solarium of the Triboro Hospital for the Tubercular.

More than a hundred plants (trees, shrubs, and herbaceous plants) were supplied to embellish the grounds of the William Howard Taft High School.

Leaves and seeds of *Koelreuteria* were sent to Dr. Albert Hartzell of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., for his studies in the insecticidal properties of various plants.

Eight lots of poison ivy leaves were supplied to a firm of manufacturing pharmaceutical chemists "to prepare an acetone extract and an extract with a new menstruum for testing purposes at one of the hospitals in the city."

52 plants, 96 cuttings in 23 varieties, and 1 package of seed were sent to the Botany Department of Taylor University, Upland, Indiana.

Plants and cuttings of 14 species of tropical plants were supplied to the Agricultural Experiment Station, Knoxville, Tennessee.

Courses of Instruction

I conducted three courses of Instruction for Members and the General Public at the Botanic Garden.

Respectfully submitted,

Montague Free,
Horticulturist.

REPORT OF THE CURATOR OF THE HERBARIUM FOR 1941

To the Director:

I submit herewith my report for the year ending December 31, 1941.

The Local Flora Section

One of the most important types of plant habitat in the New York area is that affected by limestone ledges. The friable condition of the stone and the abundance of plant nutriment de-

veloped by its erosion foster a brilliant and peculiar spring vegetation found only in the region of limestone outcrops. Such a development has been lacking in the Local Flora Section, but through the kindness of Mr. Augustus Wittingham, of Andover, New Jersey, we have obtained sufficient rock to construct a ledge or embankment, which will simulate a natural outcrop and provide favorable places of growth for such plants as the sharp-leaved hepatica. There are a great many flowering plants and ferns which can grow under no other conditions. This wall is now being constructed at the eastern end of the Section and should be ready by mid-summer of this year. With the accession of this limestone area the plant habitat groups of the New York region will have been essentially completed, although much remains to be done in the mass production of plants and in the constant amelioration of soil conditions.

During the past year there has been a good deal of thinning out of underbrush and of some trees, but more thinning is required from year to year. This is especially true of the woodland, which was planted about 1918 and which has now reached some degree of maturity. The tulip tree (*Liriodendron*) and the sweet gum (*Liquidambar*) tend to grow at a much more rapid rate than any of the other trees; the tulip tree especially tends to quickly dominate the slower-growing oaks and maples. In the course of the year the sandy border of the pond has been renewed and replanted. Portions of the bog have been dug out and replaced with fresh peat, a procedure involving a considerable amount of replanting. In a section along the brook, ground has been prepared to a considerable depth and planted with Virginian cowslip. Another portion of ground adjacent to the DeVries memorial tree will require some change incidental to the construction of an area for the growth of marsh marigold and wild hellebore (*Veratrum viride*).

A portion of the Local Flora area is exposed to the sweep of cold winds from the northwest. This factor, together with the unusually dry spring, contributed to the damage of a number of plants, chiefly our specimens of *Juniperus communis*, our largest bog spruce (*Picea mariana*), and some of the swamp cedars (*Chamaecyparis*). The growth of our northern plants, such as

twinflower (*Linnaea*), bunchberry (*Cornus canadensis*), and the creeping snowberry (*Chiogenes*), has been most gratifying. The sand barren plants, such as *Corema*, sandwort (*Arenaria squarrosa*), bearberry (*Arctostaphylos*), and others have been satisfactory. These plants have become thoroughly established, and their culture is no longer a problem.

Herbarium

The herbarium was enriched by the collections made by me in Ecuador and Peru, while working under funds from the John Simon Guggenheim Memorial Foundation. Much of the dried material which was obtained is now ready for distribution to other botanical gardens. The specimens, which have been derived through exchange with other institutions, will be found in the adjoining lists. A large amount of material, especially Cyperaceae, is coming in from various sources for determination.

Herbarium Material Loaned

	Sheets
Chandler, Mr. Albert, St. Louis, Missouri	18
Fosberg, Dr. F. R., U. S. Department of Agriculture, Washington, D. C.	1
Frick, Dr. T. A., Hiwasee College, Madisonville, Tenn.	8
Gray Herbarium, Cambridge, Mass.	3
New York Botanical Garden, Bronx Park, N. Y.	1
Senn, Dr. H. A., Central Experimental Farm, Ottawa, Canada	2
	33

Herbarium Material Borrowed for Study

Brown, Mr. Clair A., Louisiana State University, Baton Rouge, La.	69
Clausen, Dr. R. T., Cornell University, Ithaca, N. Y.	16
Core, Dr. E. L., West Virginia University, Morgantown, W. Va.	5
Goodwin, Dr. R., University of Rochester, Rochesetr, N. Y.	31
McFarlin, Dr. J. B., U. S. Dept. of the Interior, National Park Service, South Miami, Florida	19
Missouri Botanical Garden, St. Louis, Mo.	4
Senn, Dr. H. A., Central Experimental Farm, Ottawa, Canada	23
Shaver, Dr. J. M., George Peabody College, Nashville, Tenn.	12
Tolstead, Dr. W. L., University of Nebraska, Lincoln, Neb.	56
U. S. Forest Service, Washington, D. C.	13
U. S. National Herbarium, Washington, D. C.	3
	251

Herbarium Accessions and Distribution

Phanerogamic Herbarium

Accessions:	*Sheets*	
By Gift:		
Ek, Mr. Charles M., Kokomo, Indiana	2	
Fraser, Rev. Samuel V., Aurora, Kansas	10	
Hanmer, Mr. C. C., Fishers Island, N. Y.	72	
Hayden, Dr. Ada, Iowa State College, Ames, Iowa	9	
Holst, Dr. Pedro, Guayaquil, Ecuador, South America	2	
Kittredge, Miss E. M., Vergennes, Vermont	10	
Lepage, Rev. E., Rimouski, Quebec, Canada	15	
Morgan, Rev. M., St. Bernards College, St. Barnard, Ala.	4	
Street, Mr. Haskell R., Marshall, Texas	130	
Wilson, Mrs. Francis A., Brooklyn, New York	50	304
By Exchange:		
Bazuin, Mr. C. W., Grand Rapids, Michigan	36	
Charette, Mr. Leopold, Burlington, Vermont	141	
Cory, Mr. V. L., Texas Agricultural Experiment Station, Sonora, Texas	6	
Field Museum of Natural History, Chicago, Illinois	84	
Fogg, Dr. J. M., Jr., University of Pennsylvania, Philadelphia, Pennsylvania	118	
Goodwin, Dr. Richard, University of Rochester, Rochester, New York	1	
Gray Herbarium, Cambridge, Mass.	193	
Howell, Mr. J. T., California Academy of Sciences, San Francisco, California	131	
McFarland, Dr. F. T., University of Kentucky, Lexington, Ky.	100	
McFarlin, Dr. J. B., U. S. Dept. of the Interior, National Park Service, South Miami, Florida	7	
Missouri Botanical Garden, St. Louis, Mo.	20	
Senn, Dr. H. A., Central Experimental Farm, Ottawa, Canada	234	
Sharp, Dr. A. J., University of Tennessee, Knoxville, Tennessee	425	
Shaver, Dr. J. M., George Peabody College, Nashville, Tennessee	3	
U. S. Forest Service, Washington, D. C.	3	
U. S. National Herbarium, Washington, D. C.	4	
Wiegand, Dr. K. M., New York State College of Agriculture, Ithaca, N. Y.	526	
Zobell, Dr. H. L., University of Denver, Denver, Colorado.	75	2,107

By Collection:		
Ashwell, Miss G. Elizabeth, Brooklyn Botanic Garden	8	
Graves, Dr. A. H., Brooklyn Botanic Garden	9	
Svenson, Dr. H. K., Brooklyn Botanic Garden	1,900	1,917
By Purchase:		
Ek, Mr. Charles M., Kokomo, Indiana	250	
Kittredge, Miss E. M., Vergennes, Vermont	130	
Terry, Mrs. R. A., Boquete, Chiriqui Province, Panama	187	567
		4,895

Distribution:

	Sheets	
By Exchange:		
Bazuin, Mr. C. W., Grand Rapids, Michigan	1	
Blake, Dr. S. T., University of Queensland, Brisbane, Australia	47	
Bowden, Dr. W. M., University of Western Ontario, London, Ontario	1	
Clausen, Dr. R. T., Cornell University, Ithaca, N. Y.	1	
Conard, Dr. H. S., Grinnell College, Grinnell, Iowa	1	
Fassett, Dr. Norman C., University of Wisconsin, Madison, Wisconsin	130	
Field Museum of Natural History, Chicago, Illinois	1	
Missouri Botanical Garden, St. Louis, Missouri	1	
New York Botanical Garden, Bronx Park, N. Y.	9	
Senn, Dr. H. A., Central Experimental Farm, Ottawa, Canada	1	
Tolstead, Dr. W. L., University of Nebraska, Lincoln, Nebraska	1	
U. S. National Herbarium, Washington, D. C.	2	196
By Gift:		
Fraser, Rev. Samuel V., Aurora, Kansas	2	2
		198

Cryptogamic Herbarium

Distribution:

By Exchange:		
Linder, Dr. D. H., Harvard University, Cambridge, Mass.	10	

Mycological Herbarium

Accessions:

By Exchange:		
Division of Mycology and Disease Survey, Mycological Collections, Bureau of Plant Industry, U. S. D. A.	11	

Respectfully submitted,

HENRY K. SVENSON,
Curator of the Herbarium.

REPORT ON THE LIBRARY FOR 1941

To the Director:

I submit herewith my report for the year ending December 31, 1941.

Accessions

The collections at present comprise 43,301 pieces of which number 22,770 are volumes and 20,531 are pamphlets, an increase of 645 volumes and 1,824 pamphlets, or 2,469 pieces during 1941. Volumes purchased totaled 163. Gifts during the year were 78 volumes, 1,343 pamphlets, and 884 parts. The list of donors is included in Appendix I.

Of periodicals and other serials the library received 615 as exchanges, 80 as gifts, 117 as purchases, and 6 through publication, making a total of 818 titles.

List of some important accessions

Bauhin, Caspar. Prodromos theatri botanici . . . Francofurti ad Moenum, 1620.

Boerhaave, Hermann. Index plantarum, quae in horto academico Lugduno Batavo reperiuntur . . . [Leyden], 1710.

Brongniart, A. T. Sur la classification et la distribution des végétaux fossiles. Paris, 1822.

Chabrey, Dominique. Stirpium icones et sciagraphia . . . Genevae, 1666.

Huerto, Garcia del. Aromatum et simplicium aliquot medicamentorum apud Indos nascentium historia . . . Quarta editio. Antverp., 1593.

Johnson, Thomas. Opuscula omnia botanica . . . London, 1847.

Lauremberg, Peter. Horticultura, libris II . . . Francofurti ad Moenum, 1632.

Leeuwenhoek, Antony van. Vijfde vervolg der brieven . . . Delft, 1696.

——. Sesde vervolg der brieven . . . Delft, 1697.

——. Sevende vervolg der brieven . . . Delft, 1702.

Logan, James. Experimenta et meletemata de plantarum generatione . . . London, 1747.

Nägeli, C. W. von. Botanische mittheilungen . . . München, 1863–1881. 5 vols.

Wolff, C. F. Theoria generationis. Halae ad Salam, 1774.

Library Work

The last space available for shelving in the rooms allotted to the library was filled during the year by the installation in the

reading room balcony of four wooden bookcases. Together with the four bookcases installed late in 1940 these provided ninety-six shelves for the immediate expansion of the periodical and classified collection. Before many years, however, the problem of additional space for the library will again present itself. For a library is not static but expands through the normal purchase, exchange, and gift of material.

An outstanding gift during the year was that of twelve volumes given by the Pierrepont family of Brooklyn. This included the beautifully illustrated Indigenous Flowers of the Hawaiian Islands, painted and described by Mrs. Francis Sinclair. An early Dutch herbal, Stephen Blankaart's De Nederlandschen herbarius . . . Amsterdam, 1714, was given by Mrs. Henry J. Davenport. This copy contains the signature and notes of John B. Zabriskie, who practiced medicine in Brooklyn during the early years of the nineteenth century. Mr. Alain White presented the two-volume work The Succulent Euphorbieae (Southern Africa), of which he is joint author with R. A. Dyer and B. L. Sloane. Mr. C. C. Hanmer of East Hartford, Connecticut, gave a file of three hundred numbers of botanical periodicals which, as they are duplicates of items in the library, will be very useful for exchange purposes. These were in addition to twenty-one items new to the library. By supplying material from their personal sets members of the staff have made possible the completion of the library's files of some periodical items. Also in this way a duplicate set of the *Bulletin* of the Torrey Botanical Club and of *Torreya* were assembled for deposit in the Herbarium. There also were extensive donations by staff members, especially of pamphlets new to the library collection.

Two volumes containing copies of translations of articles originally published in the French, German, Russian, Dutch, Spanish, Portuguese and Italian languages were presented by Mr. Willard M. Porterfield, head of the New York office of the Division of Hillculture, Soil Conservation Service of the United States Department of Agriculture. These supplement two volumes presented previously. Since 1938 the library's collection of foreign periodicals has been utilized in this project's search for data on plants which might be adapted for use in soil conservation. This

is but one instance of the utilization of the library's resources for work of immediate practical value.

Exchange of duplicate material with other libraries secured 273 items.

Reclassification was completed during the year, save for the Children's Club Room Library, on which work was begun. The reading room was painted during July. In December air-raid precautionary measures included having boxes made for the storage of the rare books and listing these books so that records could be quickly compiled should the necessity of immediate storage arise.

In June the Works Progress Administration's binding project was discontinued due to budgetary readjustments. Since the beginning of 1941 436 volumes had been bound and 2,000 pamphlet covers made. Altogether since 1939 this project had bound a total of 1,279 volumes and made 4,800 pamphlet covers for the library.

On April 21st the Library Committee of the Woman's Auxiliary of the Garden gave a tea for the staff of the Central Branch of the Brooklyn Public Library, our newly acquired neighbor. On display were some of the early Herbals and illustrated botanical works.

Interlibrary Loans

Books were loaned to: Boyce Thompson Institute, Yonkers, N. Y.; Brown University, Providence, R. I.; Carnegie Institution of Washington, Dept. of Genetics, Cold Spring Harbor, L. I.; Columbia University, New York; Consolidated Edison Co., New York; E. I. DuPont de Nemours & Co., Experimental Station, Wilmington, Del.; New York Botanical Garden; New York University, Washington Square Library; Princeton University, Princeton, N. J.; Rockefeller Institute for Medical Research, New York and Princeton, N. J.; E. R. Squibb & Co., Brooklyn; Toronto University, Toronto, Canada; United Fruit Co., New York; U. S. Dept. of Agriculture, Washington, D. C.; William R. Warner & Co., New York.

Books were borrowed from: Brooklyn Museum; Brooklyn

Public Library; New York Botanical Garden; Yale University, New Haven, Conn.

The statistical report follows.

Respectfully submitted,
WILLIAM E. JORDAN,
Librarian.

STATISTICAL REPORT ON THE LIBRARY

ACCESSIONS

	Autograph Letters	*Portraits*	*Volumes*	*Pamphlets*	*Parts (Including Periodicals)*
Exchange	0	0	23	284	3,650
Gift	35	18	78	1,343	884
Publication	0	0	0	186	56
Purchase	0	1	163	11	857
By binding	0	0	381	0	0
Total	35	19	645	1,824	5,447

Total number of volumes in library, December 31, 1940	22,125
Number of volumes added during 1941	645
Total number of volumes in library, December 31, 1941	22,770
Total number of pamphlets in library, December 31, 1940	18,707
Number of pamphlets added during 1941	1,824
Total number of pamphlets in library, December 31, 1941	20,531
Total number of volumes and pamphlets in library, December 31, 1940	40,832
Net increase of volumes and pamphlets during 1941	2,469
Total number of volumes in library, December 31, 1941	43,301

American Fern Society Collection

Number of volumes, December 31, 1940	47
Number of volumes added during 1941	2
Total number of volumes, December 31, 1941	49
Number of pamphlets, December 31, 1940	290
Number of pamphlets added during 1941	10
Total number of pamphlets, December 31, 1941	300
Number of parts added during 1941	4

Serials and Periodicals

(Including only those of which numbers were received in 1941)

Subscription	117
Gift	80
Exchange	615
Publication	6
Total	818

CATALOGING

Books, Pamphlets, and Serials catalogued	2,175
Total number of cards typewritten and filed	2,985

Printed Cards

Torrey Botanical Club index cards on file, December 31, 1940	59,632
Filed during 1941	1,589
Total	61,221

MISCELLANEOUS

Number of users of the library	3,516
Books lent to members of the staff	1,077
Books lent to other institutions	49
Books borrowed from other institutions	8

REPORT OF THE RESIDENT INVESTIGATOR (FERNS) FOR 1941

TO THE DIRECTOR:

I submit herewith my report for the year ending December 31, 1941.

A report of the year's work on variation in the Boston Fern (*Nephrolepis exaltata* var. *bostoniensis*) and certain native fern species may be found on pages 104–105.

Membership on the editorial staff of the *American Fern Journal* and on a special Membership Committee of the American Fern Society has involved a large amount of correspondence and conference relative to these two activities. In addition, during Dr. Svenson's absence in South America, I was designated as "Acting Treasurer" of the Fern Society and served from the end of January until his return.

By way of results, it may be noted that under Dr. W. R. Maxon's work as editor-in-chief, the Fern Journal has completed its thirty-first volume with the largest pagination in its history. Furthermore, the back issues of the Journal, which were out of print or nearly so, have been re-issued, and the Fern Journal is now available in complete sets at the Botanic Garden. In the way of membership, the Fern Society has passed the four hundred mark for the first time in its history.

Respectfully submitted,

RALPH C. BENEDICT,

Resident Investigator (Ferns).

REPORT OF THE RESIDENT INVESTIGATOR (ECONOMIC PLANTS) FOR 1941

To the Director:

I herewith submit a report of the activities of the Resident Investigator for Economic Plants for 1941. With the consent of the Garden, the Brooklyn Botanic Garden-Long Island University Course (B-15, 16), in Economic Plants, was omitted during the 1940–1941 academic year. Several trips were made to the Botanic Garden Conservatories and Grounds in general and to the Herb and Medicinal section in particular. The Resident Investigator served as guide on these trips with groups of students from the College of Arts and Sciences and from the College of Pharmacy of Long Island University separately.

During the summer of 1941, I had the opportunity of visiting many of the botanic gardens west of the Mississippi river. This experience was most illuminating and helpful to me in realizing the great difference in the purposes of many of these institutions and in the tremendous ecological diversity of their locations and topographies. A brief study of the California Mission Gardens was also delightful and instructive. The privilege of conducting brief research projects at several of the marine biological research laboratories, especially the Scripps Institution of Oceanography at La Jolla, California, and at the oceanographic laboratories of the University of Washington at Friday Harbor, San Juan Island, Puget Sound, Washington, was appreciated. The algae are unusually abundant in this area where there are at least five genera of green algae, ten genera of brown algae, and sixteen genera of red algae that are readily available for study. The reclaiming of a limestone quarry on Vancouver Island, British Columbia, and its development into a beautiful botanic garden known as Butchart's Garden is a commendable idea and accomplishment which commercial concerns with a consideration for the destruction of natural beauty might well emulate.

Reports on research, lectures, radio talks and publications are given elsewhere in this annual report under their respective captions.

Respectfully submitted,
Ralph H. Cheney,
Resident Investigator (*Economic Plants*).

FINANCIAL STATEMENT FOR 1941

I *a*. Tax Budget January 1, 1941–June 30, 1941

Accounts	*Balances December 31, 1940 of appropriations for period 7/1/40–6/30/41*		*Expenditures 1/1/41–6/30/41*	*Balance June 30, 1941*
Personal Service				
Regular Employees	$31,602.94		$31,599.08	$3.86
Temporary Employees	8,639.25		8,639.25	0.00
Total Personal Service		$40,242.19	$40,238.33	$ 3.86
Other than Personal Service				
Supplies, Equipment, Materials, Repairs and Services		7,943.03[1]	7,885.71	57.32
Totals		$48,185.22	$48,124.04	$61.18

I *b*. Tax Budget July 1, 1941–December 31, 1941

	Appropriations for period 7/1/41–6/30/42		*Expenditures 7/1/41–12/31/41*	*Balance December 31, 1941*
Personal Service				
Salaries—Regular Employees	$59,205.00		$29,598.66	$29,606.34
Wages—Temporary Employees	19,200.00		10,159.10	9,040.90
Total Personal Service		$78,405.00	$39,757.76	$38,647.24
Other than Personal Service				
Supplies, Equipment, Materials, Repairs and Services		13,625.00	5,365.59	8,259.41
Totals		$92,030.00	$45,123.35	$46,906.65

[1] Includes $1,000.00 transferred April 17, 1941 from "Miscellaneous New York City Code No. 3050—City Fund for Salary and Wage Accrual to Code No. 1541 Repairs and Replacements" in accordance with Board of Estimate resolution dated April 17, 1941.

Permanent Funds (Restricted[1])	*Principal*	*Balance January 1, 1941*	*Income*	*Expenditures*	*Balance Dec. 31, 1941*
1. Endowment Fund	$ 55,220.17	$ 63.12	$ 1,891.38	$ 1,954.50	$ 0.00
2. Life Membership	11,068.08	9.50	357.05	366.55	0.00
3. George C. Brackett	560.89	4.08	19.07	26.51	3.36
4. Cary Library	2,248.71	20.27	76.51	39.51	57.27
5. Benjamin Stuart Gager	15,180.91	105.96	515.89	330.47	291.38
6. Martha Woodward Stutzer	10,913.34	1.46	373.97	348.52	26.91
7. Mary Bates Spalding	2,974.64	150.59	101.65	112.95	139.29
8. Alfred T. White	272,304.99	303.93	9,275.54	9,579.47	0.00
9. A. Augustus Healy Bequest	10,809.60	12.25	369.47	381.72	0.00
10. Robert B. Woodward	27,030.73	31.25	928.28	959.53	0.00
11. Endowment Increment	61,320.15	0.00	2,901.32	2,901.32	0.00
12. A. T. White Memorial Tablet	4,248.33	4.86	145.51	150.37	0.00
13. Brooklyn Institute Centennial	32,336.03	37.50	1,111.32	1,148.82	0.00
14. John D. Rockefeller, Jr.	265,062.22	312.50	9,233.22	9,545.72	0.00
15. Citizens Endowment	269,191.38	317.40	9,377.16	9,694.56	0.00
16. Henry W. Healy Trust	54,608.53	72.82	1,632.73	1,587.95	117.60
17. Mrs. H. C. Folger	1,005.29	30.54	35.15	36.03	29.66
18. John W. Frothingham	10,000.00	15.93	384.94	400.87	0.00
19. F. E. W. Fund	250,000.00	312.50	8,750.00	9,062.50	0.00
20. Ellen Eddy Shaw Endowment	24,332.67	657.22	732.21	607.04	782.39
21. Herbarium Endowment	4,000.00	32.24	123.75	28.06	127.93
22. Public Instruction Endowment	2,234.93	0.00	58.65	0.00	58.65
Totals	$1,386,651.59	$ 2,495.92	$ 48,394.77	$ 49,262.97	$ 1,627.72
Special Accounts (Restricted)					
23. Ella Reussner Trust: Income Account		$ 439.53	$ 2,117.49	$ 2,158.03	$ 398.99
24. Sustaining Membership		291.50	1,249.53	907.95	633.08
25. Annual Membership		1,429.13	3,957.04	4,637.58	748.59
26. Tuition and Sales		409.12	12,238.52	11,631.82	1,015.82
27. Collections Fund		194.43	3,459.87	3,265.74	388.56
28. Special Purposes		4,309.22	2,864.17	3,607.99	3,565.40
29. Plant Pathology Research		0.00	6,500.00	6,500.00	0.00
30. Special Contributions		1,184.93	63,218.61	61,418.62	2,984.92
Totals		$ 8,257.86	$ 95,605.23	$ 94,127.73	$ 9,735.36
Gross Total		$10,753.78	$144,000.00	$143,390.70	$11,363.08
Deduct inter-account transactions			65,796.05	65,796.05	
Grand Totals	$1,386,651.59	$10,753.78	$ 78,203.95	$ 77,594.65	$11,363.08

[1] To the educational and scientific work of the Garden.

III. Summary of Total Maintenance Budget for Year 1941

	Income			*Expenditures*			
	Personal Service	*Other than Personal Service*	*Total*	*Personal Service*	*Other than Personal Service*	*Total*	*Balance*
Balance at Dec. 31, 1940 Tax Budget Appropriations 7/1/40–6/30/41	$ 40,242.19	$ 7,943.03[1]	$ 48,185.22	$ 40,238.33	$ 7,885.71	$ 48,124.04	$ 61.18[2]
Tax Budget Appropriation 7/1/41–6/30/42	78,405.00	13,625.00	92,030.00	39,757.76	5,365.59	45,123.35	46,906.65
Total	$118,647.19	$21,568.03	$140,215.22	$ 79,996.09	$13,251.30	$ 93,247.39	$46,967.83
Less Balance at 12/31/41 of Tax Budget Appropriation for 7/1/41–6/30/42	38,647.24	8,259.41	46,906.65				46,906.65
Tax Budget (51.19%)	79,999.95	13,308.62	93,308.57	79,996.09	13,251.30	93,247.39	61.18[2]
Private Funds (48.81%)	64,403.54	24,554.19	88,957.73	61,418.62	16,176.03	77,594.65	11,363.08
Totals	$144,403.49	$37,862.81	$182,266.30	$141,414.71	$29,327.33	$170,842.04	$11,424.26[2]

[1] Includes $1,000.00 transferred from City of New York—General Accrual Fund to Code 1541—Repairs and Replacements in accordance with a resolution of Board of Estimate dated April 17, 1941.

[2] Balance of $61.18 remaining from City Appropriation for 1940–1941 reverted to City of New York—General Accrual Fund.

Respectfully submitted,
Thomas A. Donnelly,
Secretary and Accountant.

Note: The above "Financial Statement" is a transcript of Brooklyn Botanic Garden Accounts in the books of the Treasurer of the Brooklyn Institute of Arts and Sciences. The Treasurer's accounts are audited annually by a Public Accountant, and a separate audit of this "Financial Statement" is not made in order to save unnecessary expense.

Edwin P. Mayard,
Treasurer.

APPENDIX I

GIFTS RECEIVED DURING 1941

Collections Fund *

Dr. J. D. Allen
Mrs. Frank L. Babbott
Miss Dorothy L. Betts
Mrs. Grace L. Brunn
Allen D. Brush
Mrs. Glentworth R. Butler
Mrs. S. Parkes Cadman
Miss Mary D. Carroll
W. R. Coe
Mrs. Walter V. Cranford
Walter H. Crittenden
Mrs. Sidney W. Davidson
Mrs. John R. Delafield
Otto Ebel
Mrs. William Emerson
Mrs. Lewis W. Francis
William T. Guth
Mrs. J. Morton Halstead
George P. Hitchcock
Anonymous
Anonymous
Mrs. Raymond V. Ingersoll
Miss Frances T. Ingraham
William L. James
Dr. Laura A. Kolk
Mrs. George Lyons and Family
Edwin P. Maynard
Joseph McGuinness
George V. McLaughlin
Mrs. Carlton H. Palmer
Mrs. Charles E. Perkins
Mrs. James H. Post
Mrs. Frederick B. Pratt
Mrs. Benjamin Prince
Irma E. Schweikait
Mrs. John J. Sheridan
Miss Elise W. Stutzer
"C. W."
William J. Wason, Jr.
Mrs. Walter F. Wells
Alain White
Miss Harriett H. White
Richmond B. Williams
Women of '76 Chapter, N.S., D.A.R.
Miscellaneous

Total amount contributed $3,297.00

Flower Show Exhibit

International Exposition Company (Special Award) 250.00

Plant Pathology Research Fund

Anonymous 2,500.00
Anonymous 1,500.00

Ellen Eddy Shaw Endowment Fund

Dr. and Mrs. I. C. Becher . . . . . $ 5.00
Miss Johanna L. Becker 5.00
Miss Michalena L. Carroll 5.00

* *Note.*—Contributions to the Brooklyn Botanic Garden constitute proper deductions under the Federal and New York State Income Tax Laws.

Miss Helen Dugan	1.00	
Miss Bernadette Forrest	5.00	
Eugene Grossman	1.00	
Miss Louise H. Hand	5.00	
Miss Sadie Hecht	5.00	
Miss Florence D. Hoffman	5.00	
Miss Helene Nichals	5.00	
Miss Abigail O'Brien	5.00	
Pratt Institute, Kindergarden Alumnae Asso.	150.00	
Miss Vilma Raskin	1.00	
Miss Helen Robertson	1.00	
Miss Ellen Eddy Shaw and Miss Elsie T. Hammond	5.00	
Mrs. Arthur Smalley	1.00	
Mrs. Arthur Smalley in memory of Mrs. Irene Hyams	2.00	
Melvin Smalley	6.00	
Burton Weissberger	1.00	$214.00

Special Gifts for Children's Work

Mrs. Louise Davenport	10.00	
Dr. C. Stuart Gager	10.00	
Mrs. Charles E. Perkins	25.00	
Miss Ellen Eddy Shaw	14.00	$59.00

Special Needs of the Garden

Anonymous	600.00	
Anonymous	500.00	$1,100.00

Special Purposes Designated by Donors

Anonymous	$500.00
Mrs. Dean C. Osborne	30.00
Mr. Frederick T. Bonham	68.63

Library

Books

Boissevain, Mr. C. H., Colorado Springs, Col.	1
Brooklyn Trust Company, Brooklyn, N. Y.	1
Campau, Mrs. Ethel Laurens, Grand Rapids, Mich.	1
Carnegie Corporation of New York	1
Davenport, Mrs. Henry J., Brooklyn, N. Y.	1
Free, Mr. Montague, Brooklyn, N. Y.	1
Gager, Dr. C. Stuart, Brooklyn, N. Y.	19
Gager, Mrs. C. Stuart, Brooklyn, N. Y.	1

Garden City Branch, American Association of University Women	1
Graves, Dr. Arthur Harmount, Brooklyn, N. Y.	1
Gundersen, Dr. Alfred, Brooklyn, N. Y.	24
Heffernan, Hon. James J., Washington, D. C.	2
Herrera, Dr. Fortunato L., Lima, Peru	1
Lowery, Sister Mary James, Brooklyn, N. Y.	1
Moseley, Mr. E. L., Bowling Green, Ohio	1
Muenscher, Prof. W. C., Ithaca, N. Y.	1
The Pierrepont Family, Brooklyn, N. Y.	12
Sylva, Sr. Rubén, Quito, Ecuador	1
Thomson, Mr. David C., East Chatham, N. Y.	1
White, Mr. Alain, Summerville, S. C.	2
Total	74

PAMPHLETS

American Peony Society, Northbrook, Ill.	1
American Potash Institute, Washington, D. C.	10
Ames, Prof. Oakes, Cambridge, Mass.	1
Benedict, Dr. Ralph Curtiss, Brooklyn, N. Y.	1
Boyce Thompson Institute, Yonkers, N. Y.	1
British Library of Information, New York, N. Y.	2
Buffalo Museum of Science, Buffalo, N. Y.	1
Bureau of Animal Population, University Museum, Oxford, Eng.	1
Cheney, Dr. Ralph Holt, Brooklyn, N. Y.	1
Chilean Nitrate Educational Bureau, Inc., New York, N. Y.	1
Darlington, Dr. H. T., East Lansing, Mich.	1
Fairchild, Dr. David G., Coconut Grove, Fla.	4
Fawcett, Dr. Howard S., Riverside, Cal.	1
Forbes, Mr. Russell, New York, N. Y.	1
Gager, Dr. C. Stuart, Brooklyn, N. Y.	1,129
Graves, Dr. Arthur Harmount, Brooklyn, N. Y.	6
Hanmer, Mr. C. C., East Hartford, Conn.	19
Harvard University Botanical Museum, Cambridge, Mass.	1
Henry, Mrs. J. Norman, Gladwyne, Pa.	1
Henry E. Huntington Library and Art Gallery, San Marino, Cal.	2
Hyland, Prof. Fay, Orono, Me.	1
Johnston, Dr. I. M., Jamaica Plain, Mass.	1
Jordan, Mr. William E., Brooklyn, N. Y.	1
Kaiser, Dr. Samuel and Dr. H. G. Albaum, Brooklyn, N. Y.	7
Kelley, Mr. Arthur Pierson, Landenberg, Pa.	2
Mahogany Association, Inc., Chicago, Ill.	8
Metropolitan Museum of Art, New York, N. Y.	1
Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina	1
National Farm Chemurgic Council, Columbus, Ohio	1
National Research Council, Washington, D. C.	1
Pan American Union, Washington, D. C.	1

Pierce, Miss Mary Elizabeth, Brooklyn, N. Y.	84
Pijl, Dr. L. van der, Bandoeng, Java	9
Robinson, Dr. Winifred J., Newark, Del.	2
Rose Manufacturing Company, Philadelphia, Pa.	1
Save-the-Redwoods League, Berkeley, Cal.	5
Solis, Prof. M. Acosta, Quito, Ecuador	2
Spencer Lens Company, Buffalo, N. Y.	1
Stanley, Dr. Wendell M., Princeton, N. J.	8
Sunny Ridge Nursery, Swarthmore, Pa.	1
Teele, Mrs. Arthur P., Brookline, Mass.	1
United Fruit Company, Educational Dept., Boston, Mass.	3
United States Rubber Company, New York, N. Y.	1
Utter, Dr. L. Gordon, Brooklyn, N. Y.	2
Walker, Mr. E. H., Washington, D. C.	2
Wallerstein Laboratories, New York, N. Y.	1
White, Prof. R. G., Bangor, Wales	5
Whitman, Mr. Roger B., New York, N. Y.	1
Wodehouse, Dr. Roger P., Yonkers, N. Y.	3
Total	1,342

Parts of Publications

(Exclusive of Government Documents)

American Fern Society	5
American Horticultural Society, Washington, D. C.	4
American Museum of Natural History, Library, New York, N. Y.	1
American Potash Institute, Inc., Washinton, D. C.	6
American Soybean Association, Hudson, Iowa	11
Ames, Prof. Oakes, Cambridge, Mass.	12
Arboretum Foundation, Seattle, Washington	12
Association Canadienne-Française pour l'Avancement des Sciences, Montreal, P. Q.	1
Bailey, Prof. Liberty Hyde, Ithaca, N. Y.	5
Banker, Mrs. Howard J., Huntington, N. Y.	7
Bartlett Tree Research Laboratories, Stamford, Conn.	2
Bermuda Biological Station for Research, St. George's, Bermuda	1
Bernice P. Bishop Museum, Honolulu, Hawaii	1
Campbell Soup Company, Camden, N. J.	3
Carnegie Institution of Washington, Washington, D. C.	4
Chilean Nitrate Educational Bureau, Inc., New York, N. Y.	1
Colorado Scientific Society, Denver, Col.	1
Connecticut Arboretum, Connecticut College, New London, Conn.	1
Cranberry Canners, Inc., South Hanson, Mass.	26
Davey Tree Expert Company, Kent, Ohio	2
Davis, Mr. L. Irby, Harlingen, Tex.	2
DuPont de Nemours and Company, Inc., Wilmington, Del.	6

Eugenics Society of Northern California, Sacramento, Cal.	2
Fairchild, Dr. David G., Coconut Grove, Fla.	8
Fisher Scientific Company, Pittsburgh, Pa.	4
Free, Mr. Montague, Brooklyn, N. Y.	25
Gager, Dr. C. Stuart, Brooklyn, N. Y.	80
Graves, Dr. Arthur Harmount, Brooklyn, N. Y.	41
Gundersen, Dr. Alfred, Brooklyn, N. Y.	6
Hanmer, Mr. C. C., East Hartford, Conn.	2
Harvard Forest, Petersham, Mass.	1
Hecht, Miss Sadie, New York, N. Y.	6
Henry E. Huntington Library and Art Gallery, San Marino, Cal.	12
Herb Society of America, Boston, Mass.	1
Huntington Botanical Garden and Arboretum, Huntington, Ind.	2
Illinois Audubon Society, Chicago, Ill.	4
J. E. Ohlsens Enkes Plantepatologiske Laboratorium, Copenhagen, Denmark	1
Japanese Government Railways, Board of Tourist Industry, Tokyo, Japan	4
Jenkins, Mr. Charles F., Germantown, Philadelphia, Pa.	4
John Innes Horticultural Institution, Cambridge, Eng.	1
Kelley, Mr. Arthur Pierson, Landenberg, Pa.	1
Lemmon, Mr. Robert S., New Canaan, Conn.	5
McFarland, J. Horace Company, Harrisburg, Pa.	3
Medical Society of the County of Kings, Brooklyn, N. Y.	14
Mount Desert Island Biological Laboratory, Mount Desert, Me.	1
National Coconut Corporation, Manila, P. I.	10
National Research Council of Canada, Ottawa, Ont.	1
New York Association of Biology Teachers	7
Parrabère, Mr. A. P., Montevideo, Uruguay	1
Pennsylvania, University of, Morris Arboretum, Chestnut Hill, Pa.	1
Pennsylvania, University of, Library, Philadelphia, Pa.	2
Pierce, Miss Mary Elizabeth, Brooklyn, N. Y.	15
Reed, Dr. George M., Brooklyn, N. Y.	51
Riverside Junior College, Riverside, Cal.	3
Robinson, Dr. Winifred J., Newark, Del.	1
Santa Barbara Botanic Garden, Santa Barbara, Cal.	1
School Garden Association, New York, N. Y.	4
School Nature League, New York, N. Y.	9
Sociedad Mexicana de Historia Natural, Mexico, D. F.	2
Southern Methodist University, Science Depts., Dallas, Tex.	2
Swallen, Mr. J. R., Washington, D. C.	21
Towson Nurseries, Inc., Towson, Md.	4
United Brewers Industrial Foundation, New York, N. Y.	1
Usher, Dr. Robert J., New Orelans, La.	3
Utter, Dr. L. Gordon, Brooklyn, N. Y.	2
Wallerstein Laboratories, New York, N. Y.	3

West Virginia University Herbarium, Morgantown, W. Va.	5
Yale University, School of Forestry, New Haven, Conn.	5
Total	496

Portraits and Photographs

Gager, Dr. C. Stuart, Brooklyn, N. Y.	14
Pound, Dr. Roscoe, Cambridge, Mass.	1
Robbins, Dr. William J., New York, N. Y.	1
Shull, Dr. Charles A., Chicago, Ill.	1
Spencer Lens Company, Buffalo, N. Y.	1
Total	18

Autograph Letters

Gager, Dr. C. Stuart, Brooklyn, N. Y.	35

Miscellaneous

Gager, Dr. C. Stuart, Brooklyn, N. Y. Miscellaneous material relating to votes for names on Laboratory Building; Flower map of the United States; Plan of garden of Bonnefont Cloister, N. Y.

Hanmer, Mr. C. C., East Hartford, Conn. Duplicate parts and pamphlets not counted in yearly statistics: 300 parts; 5 pamphlets.

Pierce, Miss Mary Elizabeth, Brooklyn, N. Y. Duplicate parts and pamphlets not counted in yearly statistics: 167 parts; 28 pamphlets.

Wilson, Mr. Fred A., Nahant, Mass. 1 chart showing Rose ancestry.

Department of Plants

Living Plants

Arthur Hoyt Scott Foundation, Swarthmore, Pa. 44 Lilacs in 29 varieties.

Bailey, Mr. Frank. Pyracantha and Albizzia Julibrissin rosea.

Bartlett Tree Research Laboratory, Stamford, Conn. 1 Bartlett Chestnut No. 710.

Bobbink & Atkins, Rutherford, N. J. 6 species of *Hedera*, 156 Roses in 25 varieties, 1 *Elaeagnus pungens*.

Bristol Nurseries, Bristol, Conn. 2 Chrysanthemum "Ruth Cummings."

Christy, Mrs. Frances T., Brooklyn, N. Y. 2 *Ceiba pentandra*, 1 Pimento.

Coyle, Miss Grace M., Douglaston, N. Y. Cuttings of *Hedera Helix arborescens*.

Department of Public Parks and Squares, Baltimore, Md. 1 *Quercus robur fastigiata*.

Diddell, Mrs. W. D., Jacksonville, Fla. 1 *Ceratopteris pteridioides* and 1 clump of *Selaginella arenicola*.

Didier, Mrs. F. A., Brooklyn, N. Y. 3 Cashew seedlings.

Dow, Dr. Edmund LeRoy, Watch Hill, R. I. 1 *Polypodium punctatum*, 1 *Scolopendrium* sp., 1 *Selaginella Wildenovii*.

Francis, Mrs. Lewis W. 1 Branch of *Ilex itegra*.

F & F Nurseries, Springfield, N. J. 3 species of *Hedera*.
Garden Club of America, N. Y., N. Y. 85 *Trillium* in 16 species.
Graves, Arthur H., Botanic Garden. 4 *Chimaphila maculata*, 3 *Botrychium virginianum*, 5 *Cornus canadense*, 5 *Coptis trifolia*, 3 *Mitchella repens*, 2 *Viburnum Lentago*, 1 *Carya glabra*, 2 clumps *Ranunculus abortivus*, 1 clump *Pedicularis canadensis*, 1 clump *Mentha spicata*, 1 clump *Collinsonia canadensis*.
Grullemans, Mr. J. J., Brooklyn, N. Y. 3 *Puya coerulea pygmaea*.
Hahn, Sylvan, Pittsburgh, Pa. 3 species of *Hedera*.
Hecht, Miss Sadie. 1 plant of *Commelinaceae* family.
Hicks Nurseries, Westbury, L. I. 9 *Rhododendron*, 2 *Pieris*, 1 *Enkianthus*.
Johnson, Harry L., South Meriden, Conn. 1 *Teucrium canadense*, 1 *Veronica virginica*, 1 *Nymphoides peltatum*, 1 *Sorbaria arborea*.
Kelsey Nursery Service, New York, N. Y. 5 Lilacs in 5 varieties.
Lieb's Greenhouse, New Rochelle, N. Y. 2 varieties of *Hedera*.
Lobikis, Miss A., Brooklyn, N. Y. 1 *Nerium Oleander*.
Martin, Mr. Abbott, Sewanee, Tenn. 34 *Gentiana Saponaria*.
Michelson, Mr. F. E., Brooklyn, N. Y. 1 *Agave*.
Paffard, Mrs., Stonington, Conn. 4 *Caltha palustris*, 5 cuttings Geranium, 1 *Viola*.
Park Department, Rochester, N. Y. 3 species of *Acer*, 1 *Tilia*.
Pierce, Miss M. E., Fairbanks, Alaska. 1 *Rosa* "Gloria Mundi."
Princeton Nurseries, Princeton, N. J. 7 varieties of *Hedera*.
Purdy, Miss Maud H., Botanic Garden. 35 *Gentiana crinita*.
Reiter, Mr. Victor, San Francisco, Calif. 13 varieties of Fuchsia.
Rockefeller, J. D., N. Y., N. Y. 2 Bay Trees.
Roehrs, Julius, Rutherford, N. J. 2 varieties of *Hedera*.
Shaw, Awbrey N., Brooklyn, N. Y. 3 Cashew seedlings.
Spingarn, Mrs. J. E., N. Y., N. Y. 1 Bromeliad, 1 Orchid.
Swift, Mrs. Chester A., San Marino, Calif. 2 Iris species.
Tanger, Mrs. C. Y., Lancaster, Pa. 1 clump *Gentiana villosa*.
Taylor, H. Stultzer, Brooklyn, N. Y. 1 flat Cardinal Flower.
Timms, Thaddeus S., Ojai, Calif. 10 *Berberis californica*.
Tricker, Wm., Inc., Saddle River, N. J. 41 Water lilies comprising 20 varieties. 144 Water plants in 22 varieties.
Trovarelli, Mr. M., Brooklyn, N. Y. 1 tuber *Hydrosme Rivieri*.
Wayside Gardens, Mentor, Ohio. 14 Roses in 8 varieties, 4 *Papaver*.
Wurts, Mr. Arthur T., East Orange, N. J. 2 *Camptosorus rhizophyllus*.

Seed Packets

Burpee, W. Atlee, Co., Philadelphia, Pa. (1)
Evans, Mrs. H. R., Brooklyn, N. Y. (1)
Fairchild, Mrs. B. Tappen, Port Chester, N. Y. (1)
Gager, Dr. C. Stuart, Brooklyn, N. Y. (2)
Granville, Mr. Winifred N., Sheffield, England (2)
Harrison, Mrs. Stephen M., Wilbraham, Mass. (2)

Hecht, Miss Sadie (3)
Herbst Bros., N. Y. (5)
House, Dr. H. D., Albany, N. Y. (1)
Kells, Mrs. D. W., Salem, Ore. (1)
Peters, Mrs. W. Sterling, Brooklyn, N. Y. (1)
Starkweather, Mrs. H. M., Tucson, Ariz. (4)
Stumpp and Walter Co., N. Y., N. Y. (29)
Taylor, Mrs. H. Stultzer, Brooklyn, N. Y. (1)
United States Division of Forest Research, Portland, Ore. (8)
Wiemuth, Mr. Chas., Brooklyn, N. Y. (1)

Phanerogamic Herbarium

Ek, Mr. Charles M., 1 specimen of *Juncus* and 1 specimen of *Carex* collected in Indiana.

Fraser, Rev. Samuel V., 9 specimens of *Eleocharis* and 1 specimen of *Allium* collected in Kansas.

Hanmer, Mr. C. C., 72 specimens collected on Fishers Island, N. Y.

Hayden, Dr. Ada, 9 specimens of *Eleocharis* collected in Iowa.

Holst, Dr. Pedro, 2 specimens of *Smilax* collected in Ecuador.

Kittredge, Miss E. M., 10 specimens collected in Vermont.

Lepage, Rev. E., 15 fern specimens collected in Canada.

Morgan, Rev. M., 4 specimens of *Erythronium* collected in Alabama.

Street, Mr. Haskell R., 130 mounted specimens of Grasses, collected in Tennessee.

Wilson, Mrs. Francis A., collection of Alpine plants from the valley of Sallanches.

For the Department of Elementary Instruction

Bartlett, Mr. H. Noble, Three outline maps of the children's garden.

Brooklyn Technical High School Class, Ten sets of metal scoops for use in the seedroom.

Butler, Mrs. Glentworth R., One prize cup competed for by the girls in the outdoor garden; one subscription to Nature Magazine; 460 postcards for use in classwork.

Coca-Cola Company, Six books on Flower Arrangement.

Davenport, Mrs. Henry J., $10.00 for the children's work.

Gager, Dr. C. Stuart, Two gold medals as prizes for outdoor garden work; one book for the children's clubroom library.

Gager, Mrs. C. Stuart, One book for the children's clubroom library.

Garden City Branch American Association of University Women, One book for the children's clubroom library.

Garden Teachers Association, One prize cup competed for by the boys of the outdoor garden.

Goodman, Mr. and Mrs. Joseph, One prize cup in memory of Bernard Goodman competed for by the boys of the outdoor garden.

Hecht, Miss Sadie, Seed for the children's garden.

Lancaster, Sisters of Miss Bertha (Mrs. Flora Goldman, Miss Ray Lancaster, Mrs. Esther Samuels), Pompeian marble bird-bath for the children's garden, in memory of Miss Lancaster.

Perkins, Mrs. Charles E., $25.00 honorarium for children's garden work.

Shaw, Miss Ellen Eddy, Two gold honor pins for service in the outdoor garden.

Note: Gifts of money from various sources have been added to the Children's Endowment Fund and are included in the total under the heading Ellen Eddy Shaw Endowment Fund (page 139).

Miscellaneous

Bedford Surgical Company, Brooklyn, N. Y., 115,000 tongue blades.

Brooklyn Eagle, Brooklyn, N. Y., 2 photographs of views in Brooklyn Botanic Garden.

Heinemann, Mr. Herman F., 6 kodachrome views taken in Brooklyn Botanic Garden.

Jones, Mr. W. O. G., Brooklyn, N. Y., enlargement of photograph of fruiting banana plant in Botanic Garden conservatory.

Parks, Department of, Brooklyn, N. Y., 30 seats used in World's Fair grounds.

Tillotson, Mr. Harry Stanton, Philadelphia, Pa., 1 painting of miniature wild flowers.

Van Horne, Mr. V. L., Brooklyn, N. Y., 4 photographs of views in Brooklyn Botanic Garden.

Whittingham, Mr. Augustus, Newton, New Jersey, 6 truckloads of limestone rock for Local Flora Section, and fern garden.

Woman's Auxiliary of Brooklyn Botanic Garden, 30 dozen silver teaspoons.

APPENDIX 2

PUBLICATIONS BY THE BOTANIC GARDEN PERSONNEL DURING 1941

Benedict, Ralph C.

Charles Alfred Weatherby and the American Fern Journal. *American Fern Journal* **31**: 1–3. January–March.

Ferns in the News. *American Fern Journal* **31**: 22–23. January–March.

(Looser, G. 6 papers on South American ferns, and other plants.) *American Fern Journal* **31**: 25–27. January–March.

Lester Paige Breckenridge (obituary). *American Fern Journal* **31**: 39. January–March.

The American Fern Journal Through Thirty Years. *American Fern Journal* **31**: 41–48. April -May.

Review of A. J. Grout's "Moss Flora of North America north of Mexico" Vol. 2, part 4. *American Fern Journal* **31**: 116–117. July–September.

Field Trips to Fern Gardens. *American Fern Journal* **31**: 119–120. July–September.

The Gold Rush: A Fern Ally. *American Fern Journal* **31**: 127–130. October–December.

Review of D. A. Johansen's "Plant Microtechnique." *Torreya* **41**: 63–64. March–April.

Review of Richard Goldschmidt's "The Material Basis of Evolution." *Torreya* **41**: 173–175. September–October.

Bishop, George R.

Hydroponics in the home. *The Sun* (New York). January 11.

Are your house plants happy? *Garden Digest* **13**: 23–26. January.

Labels aren't pretty—but we need them. *Gardeners' Chronicle of America* **45**: 137, 148. May.

Brighten the corners with ivy. *Gardeners' Chronicle of America* **45**: 206–207. July.

Caparn, Harold A. Making a municipal rose garden. *American Rose Annual.* **1941**: 59–60.

Cheney, R. H.

Tea-Thyme Tea. *Sci. News-Letter.* May.

Myofibrillar modifications induced by caffeine in cardiac muscle of the frog. *Jour. Cell. & Comp. Physiol.* **18**: 15–20. August.

Doney, Charles.

List of Shrubs Exclusive of Conifers Growing outdoors in the Brooklyn Botanic Garden. *Bot. Gard. Record* **30**: 1–32. January.

Free, Montague.

Bugs on your begonias? *The Sun* (New York). January 25.

Varied cover for lawn bald spots. *The Sun* (New York). March 15.

The Brooklyn Botanic Garden exhibit of an ivy garden. *Brooklyn Bot. Gard. Leaflets.* Ser. 28, No. 1–3. March.

Report of the Horticulturist for 1940. *Brooklyn Bot. Gard. Record* **30**: 121–126. April.

Planting the annuals. *The Sun* (New York). April 12.

You'll want a garden. *The Sun* (New York). April 26.

Important things to watch if you're planting roses. *Garden Digest* **13**: 5–7. May.

Starting from scratch. *The Sun* (New York). May 3.

Cleaning and summer uses of the little greenhouse. *Real Gardening* **4**: 49–54. June.

Time to plant water lilies. *The Sun* (New York). June 14.

Plants in your parlor. (A chapter in *Gardening with the experts*. New York, Macmillan). p. 105–125. September.

Plant roses now. *The Sun* (New York). October 10.

How to plant your fall bulbs. *Garden Digest* **13**: 9–12. October–November.

How to plant avocado seed. *The Sun* (New York). November 28.

Free, Montague, Alfred Gundersen, and George M. Reed.

Lilacs in the Brooklyn Botanic Garden including classification, cultivation, pathology. B. B. G. Guide No. 12. *Brooklyn Bot. Gard. Record* **30**: 191–224. July.

Gager, C. Stuart.

Horticulture for everyman. *Official Program, 28th International Flower Show.* p. 141. March 17.

Brooklyn Botanic Garden in "Flatbush—Yesterday, Today." *Flatbush Magazine* **19**: 6. March.

Something new in a botany textbook [Review of Transeau, Sampson, and Tiffany, Textbook of Botany, Harper and Brothers. 1940.] *Ecology* **22**: 217. April.

Thirtieth annual report of the Brooklyn Botanic Garden; Report of the director. *Brooklyn Bot. Gard. Record* **30**: 37–189. April.

The odor of lilacs. *Brooklyn Bot. Gard. Record* **30**: 193–194. July.

Trees in city streets. *Flatbush Magazine* **19**: 1. Sept.

The Raphael of flowers. (Text for "Les Roses," folio of 12 reproductions, in color, of plates by Pierre-Joseph Redouté.) Am. Engraving Co. New York. September.

The weeping redwood (*Sequoia sempervirens pendula*). *Riptide* (Santa Cruz, Calif.) 7: 4. Oct. 4.

Graves, Arthur Harmount

Botany. Revision service (for 1940). *Colliers National Encyclopedia.* April.

Chestnut breeding work in 1940. *Brooklyn Bot. Gard. Record* **30**: 87–93. April.

Report of the Curator of Public Instruction for 1940. *Brooklyn Bot. Gard. Record* **30**: 101–111. April.

Some tree hybrids. Abstract of lecture. *Torreya* **41**: 68. April.

Birches of the New York City Region. *School Nature League Bulletin.* Series 11, No. 10. Am. Mus. of Nat. Hist. June.

Breeding work toward the development of a timber type of blight-resistant chestnut. Report for 1940. *Bull. Torrey Bot. Club* **68**: 667–674. December. Reprinted as No. 95 of *Brooklyn Botanic Garden Contributions.*

54 newspaper articles about the Brooklyn Botanic Garden.

3 abstracts for Biological Abstracts.

Gundersen, Alfred.

Flower Structure and the Classification of Dicotyledons. *Brooklyn Bot. Gard. Record* **30**: 93–98. April.

Report of the Curator of Plants for the year 1940. *Brooklyn Bot. Gard. Record* **30**: 115–119. April.

Lilacs in the Brooklyn Botanic Garden, Classification. *Brooklyn Bot. Gard. Record* **30**: 190–213. July.

Jordan, William E.

Publications of the Brooklyn Botanic Garden 1910–1940. *Brooklyn Bot. Gard. Leaflets.* **XXVIII** No. 4–7. April.

Report on the Library for 1940. *Brooklyn Bot. Gard. Record* **30**: 132–136. April.

Miner, Frances M.

A child's garden is fun. *Garden Digest* **13**: 33–36. April.

Reed, George M.

Botany. *The New International Year Book.* **1940**: 81, 82. April.

Plant Pathology. *Brooklyn Bot. Gard. Record* **30**: 81–85. April.

The Iris. *Brooklyn Bot. Gard. Record* **30**: 85–87. April.

Inheritance of smut resistance in some oat hybrids. *Amer. Jour. Bot.* **28**: 451–457. June.

Rusk, Hester M.

Some common violets. *School Nature League Bulletin.* Series 11, No. 8. April.

Shaw, Ellen Eddy.

Report of the Curator of Elementary Instruction. *Brooklyn Bot. Gard. Record* **30**: 111–115. April.

Our pattern. *Educational series, Dept. of Elementary Instruction.* June.

A children's garden in the city. *School Nature Study* (London) **36**: 102–104. July.

Svenson, Henry K.

Notes on the Tennessee Flora. *Jour. Tenn. Acad. Sci.* **16**: 111–160. January. (Reprinted as *Brooklyn Botanic Garden Contributions No. 93.*)

The Vegetation of Ecuador. *Chronica Botanica* **6**: 446–448. December.

Tilley, S. R.

Atmosphere in the garden. *Gardeners' Chronicle of America* **45**: 271. September.

Utter, L. Gordon

Control of Tulip Aphids on Southern Iris. *Jour. Econ. Entomol.* **34**: 473. August.

Utter, L. Gordon and Floyd F. Smith

Iris Thrips and methods for control. *Amer. Iris Soc. Bull.* **81**: 46–57. April.

APPENDIX 3

TALKS, LECTURES, ADDRESSES, AND PAPERS GIVEN BY THE BOTANIC GARDEN PERSONNEL DURING 1941

By the Director:

May 7. *Parks and botanic gardens.* Nat. Assoc. of Gardeners, New York City branch. At the Garden.

Oct. 28. *Horticulture in the days to come.* Long Island Horticultural Society. Bethpage, L. I.

By the Curator of Public Instruction (Dr. Graves):

January 10. *Conservation.* P. S. 42, Manhattan.

March 6. *Breeding new chestnut trees.* Englewood Garden Club, Englewood, N. J.

March 25. *The educational program at the Brooklyn Botanic Garden.* Teachers' conference at P. S. 42, Manhattan.

April 9. *Medicinal plants and the doctrine of signatures.* Society for Biology and Medicine, Brooklyn College.

April 10. *Breeding the chestnut.* Classes from Girls Commercial High School. 2 talks. At the Garden.

April 16. *Breeding the chestnut.* Class from Lincoln H. S. At the Garden.

May 1. *Forestry and conservation.* Arbor Day exercises. Brooklyn High School for Homemaking.

May 7. *Conservation.* Address at planting ceremonies, Erasmus H. S.

May 14. *Conservation and forestry.* Closing address of conservation week, Erasmus H. S.

June 3. *Conservation of Wild Flowers.* P. S. 42, Manhattan.

November 24. *Economic Plants.* P. S. 42, Manhattan.

December 18. *Breeding the chestnut tree.* Science Clubs, Eastern District H. S.

By the Curator of Elementary Instruction (Miss Shaw):

February 18. *Why flower arrangement?* Brooklyn Teachers Association Class at Girls Commercial High School Annex.

April 28. *English gardens.* Mothers Club, P. S. 241. At the Garden.

April 29. *Children's work at the Brooklyn Botanic Garden.* Garden Club Committee Meeting. At the Garden.

April 30. *The Brooklyn Botanic Garden in cherry time.* Mothers Club, P. S. 225. At the Garden.

March 11. *Suitable plant material for flower arrangement.* Brooklyn Teachers Association Class. At the Garden.

May 19. *English gardens.* Brooklyn Section, P. S. Kindergarten Association. At the Garden.

May 20. *Educational work at the Brooklyn Botanic Garden.* Town Hall Leadership School. At the Garden.

May 21. *Nature study and the teacher.* Faculty Meeting, P. S. 117 Queens.

May 28. *The upkeep of the garden.* Three Village Garden Club, Stony Brook, L. I.

October 21. *Plant structure.* Brooklyn Teachers Association Class. At the Garden.

October 21. *The Brooklyn Botanic Garden.* Garden City Branch American Association of University Women. At the Garden.

By the Curator of Plants (Dr. Gundersen):

January 1. *Flower Buds and Classification.* Botanical Society of America. (Systematic Section), in Philadelphia.

March 1. *The Evolution of Plants.* Torrey Botanical Club. At the Garden.

March 12. *Conifers of North and South America.* At the Garden.

March 19. *European and African Conifers.* At the Garden.

March 26. *Asiatic and Australian Conifers.* At the Garden.

October 18. *The Evolution of Plants.* Torrey Botanical Club. At the Garden.

By the Curator of the Herbarium (Dr. Svenson):

June 6. *The Vegetation of Ecuador.* Brooklyn Botanic Garden Staff. At the Garden.

By the Curator of Plant Pathology (Dr. Reed):

May 10. *Genetics of oat smut resistance.* Class in teaching of biology, New York University. At the Garden.

November 24. *Some illustrations of genetics.* The Students League of the Calhoun School, New York City. At the Garden.

November 27. *Some illustrations of genetics.* Biology Class, Eastern District High School. At the Garden.

By the Horticulturist (Mr. Free):

March 6. *Everyday garden problems.* Binghamton (N. Y.) Garden Club.

March 11. *New plant material.* Stamford (Conn.) Garden Club.

April 1. *Problems of the city gardener.* Brooklyn Heights Garden Club.

May 7. *Rare shrubs.* National Association of Gardeners, Greater New York Branch. At the Garden.

May 21. *Rock gardens.* Garden Club of Darien (Conn.).

July 28. *Increasing plant material.* Nathan Hale Garden Club, Huntington, L. I.

September 9. *Plant propagation.* Long Island Horticultural Society, Farmingdale, L. I.

September 26. *Fundamentals of rose growing.* School for Rosarians, West Grove, Pa.

October 7. *Flowering shrubs.* Nyack (N. Y.) Garden Club.

December 17. *Ways and means of growing alpines.* American Rock Garden Society, New York City.

By the Resident Investigator (Economic Plants) (Dr. Cheney):

February 21. *Action of Drugs on the Respiration of Plant and Animal Cells.* The Anaphy Biology Honor Society, Long Island University.

May 10. *Plants to Quench America's Thirst.* New York Botanical Garden.

May 20. *Newer Therapeutic Plant Principles.* Symposium on Medical Plants and Pharmacology. New York Association for the Advancement of Professional Pharmacy. Hotel Pennsylvania, New York City.

October 22. *Nature in Our National Parks.* Illustrated with Kodachrome Slides taken during a 12,000 mile trip to the Pacific coast during the summer of 1941. Y. M. C. A.–Y. W. C. A. Social Club at the Y. M. C. A., Ocean Avenue, Brooklyn.

By Instructors:

Miss Carroll:

January 27. *Graduation address.* P. S. 44 Richmond.
January 28. *Graduation address.* P. S. 181.
March 18. *Form in flower arrangement.* Brooklyn Teachers Association Class. At the Garden.
April 8. *Color in flower arrangement.* Brooklyn Teachers Association Class. At the Garden.
April 25. *The Brooklyn Botanic Garden in spring.* P. S. 140 Mothers Club. At the Garden.
May 14. *The Local Flora Section of Brooklyn Botanic Garden.* Brooklyn Assistants to Principals Association. At the Garden.
November 7. *The importance of nature study in education.* New York Chapter, American Nature Study Society.
November 16. *The Brooklyn Botanic Garden: its history and activities.* Forum of St. Marks Methodist Church.
December 2. *Color.*

Note: Miss Carroll also gave a series of ten lectures on Art in Nature at the Rutherford (N. J.) Adult School from February 10 to May 12.

Miss Hammond:

February 28. *Wild flowers.* Greenwich (Conn.) Woman's Club Gardeners.
March 10. *Museum work for children.* Hudson River Museum, Yonkers, N. Y.
April 8. *The Brooklyn Botanic Garden.* Mothers Club, P. S. 47. At the Garden.

Miss Miner:

February 27. *Gardening for fun.* Brooklyn Nature Club. At the Children's Museum.

April 7. *Planning and planting the school garden.* The Community School.

Note: Miss Miner also gave a course of six lectures on School Gardening from February 19 to June 19 under the auspices of the Staten Island Teachers Association.

Miss Rusk:

February 27. *Plant propagation.* Two classes from Girls Commercial H. S. At the Garden.

May 7. *Conservation of wild flowers.* Biology Club, Erasmus Hall H. S., Brooklyn.

May 9. *Conservation of wild flowers.* Assembly, Brooklyn H. S. for Homemaking, Brooklyn.

September 16. *Economic plants in the Brooklyn Botanic Garden greenhouses.* Class from Girls Commercial H. S. At the Garden.

October 14. *Plant propagation.* Class from Girls Commercial H. S. At the Garden.

By the Assistant in Woody Plants (Mr. Doney):

September 17. *Shrubs and their Cultivation.* Bay Ridge Garden Club, Union Church of Bay Ridge.

November 13. *Roadside Trees.* Executive Committee of the Roadside Committee, Long Island Association. At the Garden.

By Curatorial Assistant (Miss Ashwell):

March 5. *Soil conservation.* Brooklyn College. At the Garden.

April 22. *Systematic section of the Brooklyn Botanic Garden.* Class from Girls Commercial H. S. At the Garden.

September 30. *Carnivorous plants.* Wadleigh H. S., Manhattan. At the Garden.

October 15. *Soil conservation.* Brooklyn College. At the Garden.

October 20. *Planning a wild flower garden.* Bay Ridge Garden Club.

By the Custodian (Mr. Stoll):

August 7. *The Brooklyn Botanic Garden.* Garden Club. Milford, Pa.

By the Foreman Gardener (George R. Bishop):

January 28. *House plants.* Brooklyn Heights Garden Club.
March 17. *House plants.* Garden City (L. I.) Garden Club.
March 17. *Cold-frames and hot-beds.* Brooklyn-Queens Electric Light and Power Company Garden Club.
March 27. *Plant propagation.* Li-Pards Club, Flushing, L. I.
May 7. *Ivy.* National Association of Gardeners, Greater New York Branch. At the Garden.
July 11. *Summer pruning.* Belle Harbor (L. I.) Garden Club.
September 9. *House plants and propagation methods.* Bellport (L. I.) Garden Club.
October 15. *House plants.* Bayside Hills (N. Y.) Garden Club.

By the Rose Grower (S. R. Tilley):

May 7. *Atmosphere in the rose garden.* National Association of Gardeners, Greater New York Branch. At the Garden.
September 26. *Routine care of the rose garden.* School for Rosarians, West Grove, Pa.

APPENDIX 4

RADIO TALKS BY THE BOTANIC GARDEN PERSONNEL DURING 1941

By the Curator of Public Instruction (Dr. Graves):

From Station WNYC:

January 3. The Eleventh Commandment.
October 1. Fall Flowers at the Brooklyn Botanic Garden.

By the Curator of Plants (Dr. Gundersen):

From Station WNYC:

May 9. In Lilac Time.

By the Horticulturist (Mr. Free):

From Station WOR:

February 17. Plant freaks: Slim Jims.
April 28. Choosing annuals.

May 19. Flower in the crannied wall.
June 12. Garden mathematics: Subtraction.

By the Resident Investigator (Economic Plants) (Dr. Cheney):

From Station WNYC:

April 25. Field and Garden Beverage Plants.

By Instructors:

Miss Carroll:

From Station WNYC:

January 31. Garden magic.
December 10. Color in holiday decorations.

Miss Hammond:

From Station WNYC:

November 26. Indoor glass gardens.

Miss Miner:

From Station WNYC:

March 28. Children, prepare for your garden.

Miss Rusk:

From Station WNYC:

January 17. Poisonous plants.
December 24. Edible wild plants.

By the Assistant in Woody Plants (Mr. Doney):

From Station WNYC:

February 28. Some climbing shrubs.
April 11. Some shrubs for city gardens.
October 15. Shrubs for autumn gardens.

From Station WOR:

January 6. Plant freaks: The Seven Dwarfs.
March 5. Clinging vines.
April 7. Hedges for defense.

By Research Assistant (Dr. Utter):

From Station WNYC:

May 23. Some plant diseases and their control.
November 12. Fungi—good and bad.

By Curatorial Assistant (Miss Ashwell):

From Station WNYC:

March 14. How to make a wild flower garden.
June 20. Medicinal herbs—some facts and stories.

By Curatorial Assistant (Miss Clarke):

From Station WNYC:

October 29. Planning the winter landscape.

By the Herbarium Assistant (Miss Pierce):

From Station WNYC:

June 6. International vegetables.

By the Foreman Gardener (George R. Bishop):

From Station WNYC:

February 14. Garden design.

APPENDIX 5

FIELD TRIPS CONDUCTED, 1941

By the Curator of Public Instruction (Dr. Graves):

June 25. American Phytopathological Society through chestnut plantations at Hamden, Conn.
September 20. New York Association of Biology Teachers. Field Day at Bear Mountain, N. Y. Trip for trees and shrubs.

By the Curator of Plants (Dr. Gundersen):

October 4. Pines Around the World. Torrey Botanical Club. At the Garden.

By Instructor (Miss Rusk):

September 20. New York Association of Biology Teachers. Wild flower group. Queensboro Lake, Bear Mountain, N. Y.

September 21. Torrey Botanical Club. Salt marsh at Richmond, S. I.

By the Resident Investigator (**Ferns**) (Dr. Benedict):

September 28. American Fern Society and the Torrey Botanical Club. Field trip to Bear Swamp, near Lake Owassa, N. J.

By Curatorial Assistant (Miss Ashwell):

June 6. Torrey Botanical Club. Local Flora Section of the Brooklyn Botanic Garden.

By Herbarium Assistant (Miss Pierce):

May 15. Contemporary Club. At the Garden.

May 24. Girl Scouts from St. George's Church, N. Y. At the Garden.

May 24. Business & Professional Women's Group, St. George's Church, N. Y. C. At the Garden.

APPENDIX 6

MEETINGS OF ORGANIZATIONS AT BROOKLYN BOTANIC GARDEN, 1941

March 1. Torrey Botanical Club.
April 8. Mothers' Club, P. S. 47.
April 8. The Hill Association.

April 14. Woman's Auxiliary, Brooklyn Botanic Garden.
April 15. National Council of Jewish Women, Woodmere, L. I.
April 16. Demarest Garden Club (N. J.)
April 21. Woman's Auxiliary Library Committee.
April 25. Mothers Club, P. S. 140.
April 28. Utrecht Study Club.
April 28. Mothers Club, P. S. 241.
April 29. Presidents of Brooklyn Garden Clubs.
April 29. Women's Civic Club of the Bronx.
May 7. Women of '76, N.S.D.A.R.
May 7. National Association of Gardeners, Greater New York Branch.
May 7. Long Beach Garden Club.
May 8. Englewood Garden Club (N. J.)
May 11. Newark Y.W.C.A. (Under Reconciliation Tours, Inc.)
May 14. Brooklyn Assistants to Principals.
May 15. Contemporary Club.
May 15. American Nature Study Society, New York Chapter.
May 19. Brooklyn Section N.Y.P.S. Kindergarten Association.
May 27. Presidents Garden Clubs of Brooklyn.
May 27. Extension Service in Home Economics, Morristown, N. J.
June 25. Staten Island Garden Club.
June 26. United Service Organization.
June 26. Brooklyn Nature Club.
September 28. Reconciliation Tours, Inc.
October 14. Department of Natural Science, B.I.A.S.
October 21. American Association of University Women, Garden City Branch.
November 13. Executive Committee of Roadside Committee, L. I. Association.
December 9. Horticultural Committee of the Garden Clubs of America.

31 Organizations. Total attendance, 1,063.

APPENDIX 7

REPORT OF PHOTOGRAPHIC WORK

Negatives on file December 31, 1940		10,170
Negatives accessioned during 1941		180
Total negatives on file December 31, 1941		10,350
Lantern slides on file December 31, 1940		6,980
Lantern slides accessioned during 1941		170
Total lantern slides on file December 31, 1941		7,150
Kodachrome lantern slides made		12
Prints on file December 31, 1940		10,170
Prints made during 1941	1,941	
Used or distributed	1,761	
Prints filed during 1941		180
Total prints on file December 31, 1941		10,350
Enlargements made		49
Motion pictures made (in technicolor)		8 reels

APPENDIX 8

REPORT ON BROOKLYN BOTANIC GARDEN PUBLICATIONS, 1941

Ecology

Official Organ of the Ecological Society of America. Quarterly. Volume XXII comprised 34 papers (besides reviews, proceedings, and miscellaneous matter), 472 pages and 224 text figures (as against 39 papers, 530 pages, and 192 text figures in 1940). The circulation at the close of the fiscal year (November 30, 1941) was 1,153 as against 1,160 one year ago.

The annual budget was $6,046.61, the credit balance $1,743.44, and assets over liabilities $1,786.57 (as against $6,800.80, $1,117.48 and $1,095.66 assets over liabilities in 1940), plus the value of back sets and volumes on hand. Dr. Henry K. Svenson continued on the editorial board as the Brooklyn Botanic Garden representative. Dr. Thomas Park, of the University of Chicago, and Dr. Francis Ramaley, of the University of Colorado, continued as Zoological Editor and Botanical Editor, respectively.

Genetics

In Cooperation with "Genetics, Incorporated." Bimonthly. Volume XXVI comprised 34 papers, 680 pages, 10 plates and 85 text figures (as against 39 papers, 660 pages, 10 plates and 196 text figures in 1940). At the close of the fiscal year (November 30, 1941) the circulation was 736, the annual budget $8,188.05, and the credit balance $3,086.98 (as against 711, $8,195.15, and $2,956.32 in 1940), plus the value of back sets and volumes on hand. Dr. M. M. Rhoades, of Columbia University, continued as Managing Editor.

Brooklyn Botanic Garden Record

Quarterly. Volume XXX comprised 251 pages. The April number comprised the Annual Report. The circulation of the Record at the close of the year was 1,559.

Leaflets

One triple number and one quadruple number were issued. The circulation at the close of the year was 702.

Contributions and Memoirs

Numbers 93, 94, and 95 of the *Contributions* were published. No *Memoir* was published.

OFFICERS OF THE BROOKLYN INSTITUTE OF ARTS AND SCIENCE

CHAIRMAN, BOARD OF TRUSTEES
EDWARD C. BLUM

PRESIDENT
JAMES G. McDONALD, LL.D.[1]
ADRIAN VAN SINDEREN[2]

FIRST VICE-PRESIDENT
WALTER H. CRITTENDEN

SECOND VICE-PRESIDENT
CHARLES PRATT

THIRD VICE-PRESIDENT
SIDNEY W. DAVIDSON

TREASURER
EDWIN P. MAYNARD

SECRETARY
FRANCIS T. CHRISTY

BOTANIC GARDEN GOVERNING COMMITTEE

MISS HILDA LOINES, CHAIRMAN

PHILIP A. BENSON
EDWARD C. BLUM, *Ex officio*
WILLIAM G. CREAMER
WALTER H. CRITTENDEN
LEWIS L. FAWCETT
MRS. LEWIS W. FRANCIS
WALTER HAMMITT
WILLIAM T. HUNTER
JAMES G. McDONALD
EDWIN P. MAYNARD
ROBERT MOSES, *Ex officio*
ALFRED E. MUDGE
ADRIAN VAN SINDEREN, *Ex officio*

EX OFFICIO MEMBERS OF THE BOARD

THE FOLLOWING OFFICIALS OF THE CITY OF NEW YORK

THE MAYOR
THE COMPTROLLER
THE COMMISSIONER OF PARKS

MEMBERS OF THE BOARD

(Trustees are Elected from Membership of the Brooklyn Institute of Arts and Sciences)

Abrams, Ben
Babbott, Dr. Frank L.
Bachrach, Mrs. Clarence G.
Baxter, John E.
Bayes, Hon. William R.
Benson, Philip A.
Blum, Edward C.
Blum, Robert E.

[1] Resigned as of March 1, 1942.
[2] Beginning March 1, 1942.

Christy, Francis T.
Conway, Hon. Albert
Creamer, William G.
Crittenden, Walter H.
Davidson, Sidney W.
Dillon, Miss Mary E.
Draper, Mrs. Mary Childs
Dreier, Mrs. H. Edward
Fawcett, Hon. Lewis L.
Francis, Mrs. Lewis W.
Good, Mrs. William H.
Hammitt, Walter
Hunter, William T.
Ingraham, Henry A.
Jonas, Ralph
Ledoux, Louis V.
Lewis, Hon. Harry E.
Lewisohn, Sam A.
Lockwood, Luke Vincent
Loines, Miss Hilda
Mannix, Mrs. Henry J.
Maynard, Edwin P.
McDonald, James G.
McLaughlin, Hon. George V.
Mudge, Alfred E.
Murray, Thomas E., Jr.
Osborne, Mrs. Dean C.
Potts, Charles E.
Pratt, Charles
Pratt, Mrs. Frederic B.
Roulston, Mrs. Thomas H.
Shaw, Robert Alfred
Smith, Dr. Bernard H.
Smith, James W.
Thayer, Mrs. Hollis K.
Van Sinderen, Adrian
Voorhees, Mrs. Tracy S.
Warner, Dr. Edwin G.
Wason, William J., Jr.

WOMAN'S AUXILIARY

MRS. GLENTWORTH R. BUTLER, Honorary President
MISS JESSIE H. RIGHTER, President
Mrs. Walter F. Wells, Vice-President
Mrs. Earle P. Huff, Secretary.
Miss Dorothy L. Betts, Treasurer

Arai, Mrs. Rioichiro
Babbott, Mrs. Frank L.
Barnes, Miss Phyllis
Barton, Mrs. Cornelius Vanderbilt
Benson, Mrs. Philip A.
Betts, Miss Dorothy L.
Blum, Mrs. Edward Charles
Boardman, Mrs. George M.
Braman, Miss Emily L.
Braman, Miss Irene M.
Brewster, Mrs. Walter Shaw
Brinsmade, Miss Alice
Bromley, Mrs. Bruce
Brower, Mrs. George E.
Butler, Mrs. Glentworth R.
Cabot, Mrs. Irving L.
Carroll, Mrs. Otis Swan
Carter, Mrs. Oliver Goldsmith
Cary, Mrs. William H.
Chace, Mrs. Franklin
Childs, Mrs. William H.
Christy, Mrs. Francis T.
Cranford, Mrs. Frederick L.
Cranford, Mrs. Walter V.
Creamer, Mrs. William G.
Cruikshank, Mrs. Russell V.
Davenport, Mrs. Henry J.
Davidson, Mrs. Sidney W.
Delafield, Mrs. John R.
Dodge, Mrs. Francis D.
Doscher, Mrs. Charles
Draper, Mrs. Mary Childs
Dreier, Mrs. H. Edward
Duncan, Mrs. Cameron
Eckardt, Mrs. Remick C.
Ford, Mrs. Sumner

Francis, Mrs. Lewis W.
Frank, Mrs. George S.
Gager, Mrs. C. Stuart
Garvin, Mrs. Edwin L.
Goetze, Miss Emily
Goetze, Mrs. Otto
Good, Mrs. William H.
Goodrich, Mrs. Ernest P.
Greenman, Mrs. William B.
Hammitt, Mrs. Walter
Harrisson, Mrs. Stephen M.
Haynes, Miss Mabel
Hill, Mrs. Robert C.
Hills, Mrs. James M.
Huff, Mrs. Earle P.
Hume, Mrs. Henry M.
Hume, Mrs. Russell S.
Hyde, Mrs. Clarence R.
Ingersoll, Mrs. Raymond V.
Ingraham, Mrs. Henry A.
Jadwin, Mrs. Palmer H.
James, Mrs. Darwin R., Jr.
Johanns, Mrs. Frederick L.
Knox, Miss Maria
Lafrentz, Miss Olga L.
Lathrop, Mrs. John H.
Leech, Mrs. John E.
Lester, Mrs. Maxwell
Lockwood, Mrs. William A.
Lohman, Mrs. William H.
Loines, Miss Hilda
Mark, Mrs. Henry A.
Marshall, Mrs. William W.
Maynard, Mrs. Edwin P.
Maynard, Mrs. Edwin P., Jr.
McDonald, Mrs. James G.
McMahon, Mrs. Edward W.
Merrill, Mrs. Whitney
Mudge, Mrs. Alfred E.
Noble, Mrs. Francis L.
O'Donohue, Mrs. Charles A.
Osborne, Mrs. Dean C.
Otis, Mrs. Charles H.
Palmer, Mrs. Carleton H.
Parker, Mrs. John C.
Parsons, Mrs. Frank H.
Pashley, Mrs. Charles L.
Peck, Mrs. Bayard L.
Perkins, Mrs. Charles E.
Perry, Mrs. John M.
Peters, Mrs. Wm. Sterling
Post, Miss Jessie W.
Potts, Mrs. Charles E.
Pratt, Mrs. Frederic B.
Pratt, Mrs. Richardson
Prince, Mrs. Benjamin
Pullman, Miss Mary
Ray, Miss Mabel
Righter, Miss Jessie H.
Roberts, Mrs. John S.
Rogers, Mrs. Charles E., Jr.
Roulston, Mrs. Thomas H.
Rowe, Mrs. Frederick W.
Seabury, Mrs. Samuel
Shaw, Mrs. Awbrey N.
Shaw, Miss Ellen Eddy
Sherman, Mrs. Arnold W.
Simmons, Mrs. Frank E.
Southard, Miss Edith Brett
Stanton, Mrs. Otis C.
Thatcher, Mrs. Edwin H.
Thayer, Mrs. Hollis K.
Thirkield, Mrs. Gilbert H.
Truslow, Mrs. Walter
Tuttle, Mrs. Winthrop M.
Van Brunt, Miss Elizabeth R.
Van Brunt, Mrs. Jeremiah R.
Van Sinderen, Mrs. Adrian
Walmsley, Mrs. Robert F.
Walton, Mrs. Henry A.
Wells, Mrs. Walter F.
White, Mrs. Alexander M.
White, Miss Harriet H.
Wilson, Mrs. Francis A.
Woodward, Miss Mary Blackburne

LIST OF MEMBERS

(Revised to February 11, 1942)

For information concerning the various classes of membership consult the pages preceding this Report

Benefactors

By contribution of $100,000 or more, or by gifts of equivalent value

*Samuel P. Avery
*Babbott, Frank L.
*Brackett, George C.
*Carl H. De Silver
*Augustus Graham
*A. Augustus Healy
*Margaret I. Howe
*Jenkins, Alfred W.
*Ramsay, Dick S.
Rockefeller, John D., Jr.
*Alfred T. White (G) [1]
*Miss Frances E. White (G)
Miss Harriet H. White (G)
*Victor Wilbour
*Robert B. Woodward

Patrons

By contribution of $25,000 or more, or by gifts of equivalent value

*Frank L. Babbott
*Miss Mary Benson
Mrs. Edward C. Blum
Miss Elisabeth W. Frothingham
*Emil Fuchs
*Edwin Gould (G)
*Edward L. Graef
*Mrs. John Hills (G)
*Frank S. Jones
Mrs. Dean C. Osborne (G)
*Alfred Duane Pell
*Mrs. Caroline H. Polhemus
*Alfred W. Proctor
*William A. Putnam
*Charles A. Schieren
*Herman Stutzer
*John T. Underwood

Donors

By contribution of $10,000 or more, or by gifts of equivalent value

*Abraham Abraham
Dr. Frank L. Babbott
*Henry Batterman
*James A. H. Bell
*Mrs. Eugene G. Blackford
*William Calverly
*William H. Cary
Mrs. William H. Childs
*Walter V. Cranford (G)
Mrs. Walter V. Cranford (G)
Walter H. Crittenden
*Mrs. Ella J. Filson
*John W. Frothingham
*Lina Y. Happel
*Mary Harkness
*George A. Hearn
Joseph C. Hoagland
*Samuel N. Hoyt

* Deceased.

[1] (G), through the Botanic Garden. For names not thus designated the gifts were to some other Department of the Brooklyn Institute of Arts and Sciences.

Mrs. Mary Babbott Ladd
Mrs. Joseph H. Lester
*Frederick Loeser
Mrs. Ian MacDonald
*Henry P. Martin
*Miss Matilda McLean
*Joseph T. Perkins
*George D. Pratt
*Henry K. Sheldon
Mrs. Lydia Babbott Stokes
*Hon. Richard Young (G)

Permanent Members

By contribution of $2,500 or more, or by gifts of equivalent value

*Abraham, Mrs. Abraham
Barclay, Mrs. Reginald
Barnes, Mrs. Richard S.
*Beers, E. LeGrand
Beers, Miss M. Elizabeth
*Beers, Mrs. Mary L.
Beers, Dr. Nathan T.
*Benedict, Henry Harper
Blackford, Eugene G.
Blum, Edward C.
Boocock, Murray
*Boody, Hon. David A.
*Brackett, Miss Mary A.
Brown, Mrs. Lilla
*Campbell, Miss Mary
Carroll, Mrs. Otis Swan
*Coffin, Mrs. Sturgis
*Cook, Henry F.
Day, Prof. Cyrus Lawrence
English, Mrs. J. Radford
*Evans, Miss Mabel Louise
Fahys, George E.
*Fahys, Joseph
First Unitarian Church Society
*Freifeld, Mrs. George
Good, Mrs. John, Sr.
*Gottsberger, Francis
Hagedorn, Mrs. Herman
*Healy, Frank
*Hearn, Mrs. George A.
*Hentz, Henry
*Herriman, Miss Helen
Higgins, Tracy
Hoagland, Mrs. Raymond
Hoagland, Miss S. W.
Hodenpyl, Eugene, Jr.
How, Miss Josephine W.
Hoyt, Mrs. Mark
Hughes, Miss Celeste
Hughes, Miss Mary
*James, John S.
*Jones, Mrs. Mary L.
*Jones, Townsend
Joost, Mrs. Martin
Kelso, Mrs. Ruth C.
*Lawrence, Henry C.
*Lawrence, Lysander W.
Lawrence, Richard H.
Lindgrove, Mrs. Marjorie S.
*Lord, Mrs. John Bradley
Low, A. Augustus
*Maxwell, J. Rogers, Jr.
McMahon, Joseph T.
*Morse, Horace J.
*Olcott, George M.
*Palmer, Lowell M.
Payne, Mrs. Edward D.
*Peabody, George Foster
*Pell, Mrs. Cornelia L.
*Post, James H.
Powell, Mrs. Robert E.
Sanger, William
*Sanger, William Cary
Self, Mrs. Edgar A.
*Sheldon, Mrs. Henry K.
*Simonds, Mrs. William R.
Smith, Mrs. Annie Morrill
Smith, Howard C.
*Vander Weyde, Mrs. N. J.
Walsh, Mrs. Anna F.
*White, Alexander M.
*Woodward, Mrs. John B.

Life Members

By contribution of $500 or more, or by gifts of equivalent value

Through the Botanic Garden

Bailey, Frank
Bobbink, Lambertus C.
Butler, Mrs. Glentworth R. (In memory of Dr. Glentworth R. Butler.)
Cary, Mrs. William H.
Childs, Eversley
Engelhardt, George P.
Gager, Dr. C. Stuart
Hicks, Henry
Hunter, William T.
Jonas, Ralph
Loines, Miss Hilda
Mudge, Alfred E.
Osman, Fred D.
Perkins, Mrs. Charles E.
Potts, Maj. Charles E.
Pratt, Mrs. Harold I.
Shaw, Miss Ellen Eddy
Smith, Mrs. Annie M.
Thatcher, Edwin H.

Through other Departments of the Institute

Abraham, Lawrence E.
Ager, John Winifred
Albertson, Rev. Charles Carroll
Allan, Mrs. Evelyn W.
Allen, Miss Mary W.
Batterman, Charles H.
Batterman, Henry L.
Batterman, Miss Minnie P.
Baxter, F. W.
Bayes, Hon. William R.
Baylis, A. B.
Baylis, Wm., Jr.
Benson, Philip A.
Blumenthal, Maurice
Bolwell, Mrs. Sarah A.
Boody, Alvin
Brasher, Philip
Brasher, Reginald I.
Brockway, Miss Emma A.
Brooks, Albert J.
Brown, John W.
Campbell, Mrs. Wm. Mitchell
Chauncey, Rev. E. F.
Chittenden, Miss Alice H.
Clarke, Rev. L. Mason
Corlies, Howard
Cram, Mrs. Howard W.
Crane, Judge Frederick E.
Curtis, Henry S.
Dalby, Archibald B.
Davis, William T.
Denbigh, Dr. John H.
Dixon, Theodore P.
Dougherty, Andrew, Jr.
Doyle, Mrs. Allan M.
Draper, Ernest G.
Draper, Mrs. Mary Childs
Dreier, Theodore
Dykeman, Conrad V.
Elmhirst, Mrs. Dorothy P. Whitney
English, George L.
Evans, Mrs. Gertrude C.
Fara Forni, Mme. A. F.
Farmer, Walter B.
Farrell, James A.
Farrier, Albert Moses
Farrier, Frederick B.
Fawcett, Hon. Lewis L.
Ferrier, Miss Elizabeth A.
Fish, Mrs. L. W.
Flagg, Mrs. Montague
Flinsch, Rudolph E. F.
Foote, Alfred Sherman
Ford, Sumner
Francis, Mrs. Lewis W.
Francken-Sierstorpff, Countess von

Frank, Mrs. George S.
Frazier, Kenneth
*Frothingham, Miss Helen H.
Gardner, William
Gibb, William T.
Gifford, Ira L.
*Gilbert, Miss A. Louise M.
Gilbert, William T.
Good, Mrs. John, Jr.
Good, Mrs. William H.
Goodnow, David F.
Goodnow, Prof. Frank J.
Goodnow, Weston W.
Grace Church (Brooklyn)
Hall, Charles H.
*Heckscher, August
Hester, Mrs. Ada Gibb
Hill, William B.
Hollenback, Miss Amelia B.
Hooker, Dr. Davenport
Huber, Joseph
Husson, Miss C. Julie
Hyde, Henry St. John
Hyde, James H.
Ingraham, Miss Frances
Ingraham, George S.
Jeffrey, Dr. Stewart L.
Jones, Miss Emily W.
Kahn, Mrs. Otto
Kelekian, Dikran G.
Kellogg, Dwight H.
Kennedy, Mrs. Mary A.
Kenyon, Mrs. Irene S.
Kenyon, Whitman W.
Lang, Mrs. Robert
Latimer, Miss Julia W.
Lewisohn, Sam A.
Lincoln, Mrs. Dorothy Chapel
Litchfield, E. Hubert
Lockwood, Luke Vincent
Love, Mrs. Henry D.
Low, Ethelbert Ide
Low, Josiah O.
Ludlum, Clinton W.
Lynde, Mrs. Martha R.
Mason, William P.
Maxwell, Henry L.
May, Joseph M.
Maynard, Edwin P.
McAneny, Hon. George
McLaughlin, Hon. George V.
Melish, Rev. John H.
Metcalf, Jesse
Moffat, David
Moffat, William L.
Moore, Mrs. W. H.
Morgan, John Hill
Morse, Miss Alice L.
Morse, Charles L.
Mundhenk, Herman
Murray, Thomas E., Jr.
O'Connor, Mrs. W. B.
Ogilvie, Donald Manson
Osborne, Mrs. Dean C.
Packard, Miss Mary S.
Paige, Clifford E.
Palmer, Henry L.
Parker, Asa W., Jr.
Parker, John C.
Peet, Mrs. Louis Harman
Pierrepont, John J.
Pierrepont, Seth Low
Polhemus, Miss R. A.
Potts, Maj. Charles E.
Pratt, Charles
Pratt, Frederic B.
Pratt, Mrs. Frederic B.
Prentiss, Russell E.
Prosser, Thomas Harold
Prosser, Walter R.
*Ramsdell, Mrs. F. Van N.
Robinson, George C.
Robinson, Dr. Nathaniel
Ruger, Mrs. May J.
Ruscoe, Miss Rose
Russell, James T., Jr.
Sanbern, Mrs. Frank H.
Schenck, Miss Eunice M.
Schieren, Harrie Victor
Shaw, Robert Alfred
Sheldon, Mrs. Anna B.
Sheldon, Henry

Smith, Mrs. Helen Ward
Snow, Helmer
Squier, Frank
Stevens, Mrs. Roy G.
Stevens, Shepherd
Stewart, Douglas MacC.
Stutzer, Miss Elise W.
Sullivan, Andrew T.
Taylor, Miss Bessie
Taylor, Mrs. Helen S.
Taylor, William H.
Thursby, Miss Ina
Tucker, Mrs. George S., Jr.
Turner, Mrs. Bertha C.
Tuthill, Miss Isabel H.
Valentine, P. A.
Van Sinderen, Adrian
Van Sinderen, Mrs. Adrian
Wagner, Miss Marie
Walbridge, Robert R.
Warbasse, Mrs. James P.
Warner, Dr. Edwin G.
*Way, Breading G.
Weber, Mrs. Herman C.
Webster, Mrs. Edward H.
White, Harold T.
White, S. V.
Whitney, Sumner B.
Wisner, Mrs. Horatio S.
Woodward, Miss Mary Blackburne
York, Rt. Rev. Mgr. John C.

Contributing Members

By Annual Contribution of $100.00

Abrams, Ben
Babbott, Dr. Frank L.
Barton, Mrs. C. Vanderbilt
Baxter, John E.
Blum, Edward C.
Blum, Mrs. Edward C.
Blum, Robert E.
Boyle, Wm. N.
Brooklyn Daily Eagle
*Campbell, Miss Mary
Cumbers, Richard C.
Denby, Mrs. Edwin H.
Draper, Mrs. Mary C.
Dreier, Mrs. H. Edward
Drysdale, Robert A.
Fawcett, Lewis L.
Feil, Mrs. Helen R.
*Fernald, Robert L.
Geer, Mrs. Edward F.
Good, Mrs. Wm. H.
Graham, John D.
Hammitt, Walter
Hills, Mrs. James M.
Ingersoll, Mrs. Raymond V.
Ingraham, Henry A.
Jadwin, Mrs. Palmer H.
James, Mrs. Darwin R.
Kelly, Frank V.
Leech, Mrs. John E.
Leviton, Isidor
Lewis, Hon. Harry E.
Livesey, Mr. Edward J.
Logan, Miss Anna A.
Mackey, John J.
Mannix, Mrs. Henry
Mehldau, Carl J.
Molloy, S.T.D., Most Rev. Thos. E.
Moss, Maximilian
Osborne, Mrs. Dean C.
Pratt, Charles
Pratt, Frederic B.
Pratt, Mrs. Frederic B.
Rabinowitz, Mr. L. M.
Rothschild, Walter
Roulston, Mrs. Thomas H.
Shaw, Robert Alfred
Simmons, Mrs. Frank E.
Tabor, Albert I.
Turner, Henry C.
Voorhees, Mrs. Tracy C.
Whitlock, George

Sustaining Members

By payment of $25 annually

Adams, Charles S. (M)
Addinsell, Mrs. Frederick (M)
Aibel, Irving J. (E)
Allen, Chester A. (E)
*Anderson, John (G)
Auerbach, Nat (E)
Baar, Emil N. (E)
Bachrach, Mrs. Clarence G. (E)
Baily, Mr. E. A. (E)
Baily, Harold J. (E)
Barber, Mrs. Robert F. (E)
Barell, Nat A. (E)
Barnewall, George A. (E)
Barrett, G. C. (E)
Barry, Bartholomew J. (E)
Betts, Miss Dorothy L. (E)
Bishop McDonnell Memorial High School (M)
Bladen, Hon. John T. (E)
Blaisdell, Mrs. Joseph F. (E)
Boetticher, Miss E. C. (G)
Bowne, Lloyd F. (E)
Brennan, Lennox C. (E)
Bromley, Mrs. Bruce (E)
Brooklyn College (E)
Brooklyn High School for Home Making (M)
Brower, Mrs. George E. (G)
Brown, Samuel T. (E)
Brukenfeld, Morris (G)
Bryant, Miss Helen W. (G)
Burger, Bernard A. (E)
Burns, Robert (E)
Cabot, Dr. Irving L. (G)
Cameron, Mrs. James A. (G)
Campbell, Dr. Harold G. (E)
*Campbell, Miss Mary (M)
Caplin, Miss May (E)
Carberry, Miss Veronica (E)
Carpenter, Mrs. James Norman (G)
Carr, Albert L. (E)
Cashmore, Hon. John (E)
Christy, Francis T. (E)
Cleaveland, Mrs. Edward L. (E)
Clement, Arthur W. (M)
Colton, Gordon W. (E)
Conroy, Gardiner (E)
Conway, Hon. Albert (E)
Cranford, Duncan (E)
Creamer, Wm. G. (E)
Creamer, Mrs. William G. (E)
Crittenden, Walter H. (E)
Cruikshank, Mrs. Russell V. (E)
Davenport, Mrs. Henry J. (G)
Davidoff, Dr. Leo M. (E)
Davidson, Sidney W. (E)
DeSilver, Mrs. Margaret T. (E)
Dillon, Miss Mary E. (E)
Doolittle, Mrs. R. Edson (E)
Doscher, Mrs. A. B. (M)
Dreier, H. E. (E)
Ebinger, Arthur C. (E)
Ebinger, Walter D. (E)
Eckhardt, Mrs. Remick C. (M)
Edwards, Mrs. Wm. Seymour (M)
Ernst, Mrs. John Henry (E)
Faber, Lothar W. (M)
Fackenthal, Joseph Diehl (E)
Fawcett, James M. (E)
Felter, Mrs. Mary Bentley (E)
Ficks, Miss Edna (E)
Field, Mrs. W. D. C. (M)
Field, Dr. William H. (E)
Foote, Mrs. Merrill N. (E)
Forward, DeWitt A. (E)
Francis, Hon. Lewis W. (E)
Franklin, Mrs. Charles (E)
Froeb, Charles (M)
Frohne, Mrs. Theodore (G)
Garden Club of Bay Ridge (G) (2 memberships)
Garvin, Mrs. Edwin L. (E)

Glenmore Junior High School 84 (E)
Gomory, Andrew L. (E)
Gonnoud, A. J. (E)
Grace, Dr. Edwin J. (E)
Grafflin, Douglas G. (M)
Graves, Mrs. Arthur H. (E)
Hager, Albert B. (E)
Halstead, Mrs. J. Morton (M)
Halstead, Mrs. Kenneth B. (E)
Haynes, Mrs. Edward (M)
Hazell, Mrs. Joseph W. (E)
Hollenback, Miss Amelia B. (E)
Hume, Mrs. Henry M. (E)
Hutton, Albert (E)
Immergut, Dr. Sidney (E)
Ingraham, E. A. (G)
Jaffee, Louis J. (E)
James, Halsted (M)
James, John Wells (E)
James, William L. (E)
Johanns, Mrs. Frederick L. (E)
Johnson, Hon. Frank E. (E)
Jones, Allen Northey (E)
Junior High School 162, Bklyn (E)
Kaltenborn, H. V. (E)
Kennedy, Miss Mary A. (E)
Keough, Mrs. Austin C. (E)
King, Mrs. Warner (M)
Klinck, Jacob C. (E)
Koeppel, M. Herbert (E)
Lachlan, Miss Gertrude E. (E)
Langdon, Mrs. Palmer H. (G)
Latimer, Miss Mary (G)
Lazansky, Hon. Edward (E)
Ledoux, Louis V. (E)
Leff, Carl (E)
L'Episcopo, Dr. J. B. (E)
Lerner, Samuel S. (E)
Letsch, Carl (E)
Lew Wallace Junior High School 66 (E)
Lieberman, Dr. Elias (E)
Logan, Miss Florence L. (E)
Loomis, Guy (M)
Lorence, Louis (E)
MacKay, Mrs. Frederick D. (M)
Maddock, Paul L. (E)
Marrus, Mrs. Seth (E)
Martin, P. H. (E)
Max, Mrs. Anna P. (E)
Maynard, Dr. Edwin P., Jr. (E)
Maynard, Mrs. Edwin P., Jr. (E)
McCullough, F. Herbert (E)
McDonald, James G. (E)
McGarey, Hon. Francis D. (E)
McKeon, James C. (E)
McMail, Miss Elizabeth (E)
Mead, D. Irving (M)
Michaels, Joseph, Jr. (E)
Morton, Edward C. (M)
Moskin, Mrs. Julius (E)
Murphy, Charles (E)
Neilson, B. G. (E)
Neimeth, Edward (E)
Noonan, Mrs. Wm. E. (E)
O'Dwyer, Hon. William (E)
O'Malley, Walter F. (E)
Palmer, Carleton H. (E)
Parker, Mrs. William B. (E)
Parsons, Mrs. Frank H. (E)
Pearsall, Samuel (M)
Peck, Howard C. (M)
Perkins, Mrs. Charles E. (E)
Petrocelli, Mrs. J. (E)
Phillips, David (E)
Postal, David (E)
Potter, Charles H. (E)
Potter, Mrs. E. M. (E)
Public School 175, Brooklyn (E)
Public School 233, Brooklyn (E)
Pullman, Miss Mary Stuart (E)
Ray, Miss Mabel (E)
Righter, Miss Jessie H. (M)
Roberts, Mrs. John S. (E)
Rogers, Mrs. Charles E., Jr. (E)
Rose, George (E)
Rosenson, Mr. A. S. (E)
Rosow, Norman (E)
Rossin, Alfred S. (M)
Russell, Miss Sarah B. (E)
Sachs, Mrs. Ada (E)

Sakolsky, Harry (E)
Sands, Mrs. Irving J. (E)
Sartori, Joseph J. (G)
Schaefer, R. J. (E)
Schepmoes, Mrs. F. R. (G)
Schnibbe, Louis (E)
Schoubye, Dr. O. Robert (E)
*See, Alonzo B. (G)
Sinclair, Donald G. C. (E)
Sinclair, Mrs. Donald G. C. (E)
Sklar, Mrs. Max (E)
Smith, Miss Arrietta (E)
Smith, Dr. Bernard H. (E)
Smith, Frank V. (E)
Smith, James W. (E)
Smith, Hon. Peter P. (E)
Smith, Dr. Wm. Sidney (E)
Southard, Miss Edith Brett (M)
Southworth, William (E)
Starr, Russell T. (E)
Stoloff, Mrs. Benjamin (E)
Straus, Hugh Grant (E)
Sussman, Sol (E)
Swanson, Robert W. (E)
Talmage, Mrs. John (E)
Taylor, Miss Agnes M. (E)
Temple, Ahavath Sholom (E)
Thayer, Mrs. Hollis K. (E)
Thompson, John Fairfield (E)
Todd, J. Herbert (E)
Trommer, George (E)
Troy, Matthew J. (E)
Trum, Miss Dorothy A. (E)
Uhrbrock, Miss Marie E. (G)
VanBrunt, Jeremiah R. (E)
VanVleck, Miss Jane (M)
Walmsley, Mrs. Clara E. (E)
Walton, Mrs. Henry A. (E)
Wason, William J., Jr. (G)
Weisglass, Mrs. Irving (E)
Weitman, Mrs. Robert M. (E)
White, Mrs. Grace (E)
Wolff, Miss E. A. (E)
Wolfson, Mrs. William L. (E)
Wood, Miss Emily S. (E)
Woodward, Miss E. Frances (E)
Zoebisch, Mrs. C. T. (M)

Annual Members

By payment of $10 annually

Abraham, Mrs. Sophie
Affeld, Miss Caroline D.
Alport, Mrs. M.
Andrews, Miss Grace
Avrutis, Mrs. Maria H.
Babbott, Mrs. Frank L.
Bahret, Miss Ruth A.
Barber, Mrs. G. Holbrook
Barnes, Miss Caroline W.
Barrow, Mrs. Kate
Bary, Mrs. Nina
Bassett, Mrs. Hubert M.
Bayne, Mrs. Laura M.
Bechtel, Edwin De T.
Beck, Mrs. Anna W.
Becker, Miss Johanna L.
Becker, Mrs. William U.
Begg, Mrs. J. W.
Behr, Edward A.
Belle Harbor Garden Club
Benjamin, Mrs. Robert M.
Benson, Miss Helen M.
Benson, Mrs. Philip A.
Berg, Mrs. J. Frederic
Berkeley Institute, The
Bildersee, Miss Adele
Blackman, Dr. William W.
Blake, Mrs. Esther
Blatchford, Miss Stella
Bleich, Mr. Emanuel E.
Blum, Mrs. Edward Charles
Blumner, Mrs. Martha M.
Boardman, Mrs. George M.
Boehrer, Mrs. Charles A.
Bonham, Frederick T.
Bornmann, Dr. Alfred

Boyhan, Mrs. Lillian
Brandwelin, Mrs. Julius
Braman, Miss Irene M.
Brandt, Mrs. Laura L.
Brenner, Mrs. Riva R.
Brevoort, C.
Brierley, John R.
Bristol, Miss Frances L.
Brockaway, Mrs. Otilia A.
Brooklyn Plant, Flower and Fruit Guild
Brossard, Miss Theodora
Brower, Frank Daniel
Brown, Mrs. G. Stewart
Brown, Mrs. Richard H., Jr.
Brown, Roscoe C. E.
*Browning, Dr. William
Buck, Leonard J.
Bulkley, Mrs. Jonathan
Bush, Mrs. Robert W.
Cadman, Mrs. Frederick L.
*Campbell, Miss Mary
Carter, Mrs. Oliver Goldsmith
Cary, Mrs. William H.
Casamajor, Miss Martha
Cedarhurst Garden Study Group
Chace, Mrs. Franklin
Christy, Mrs. Francis T.
City Gardens Club
Clark, Mrs. John B.
Clark, Dr. Raymond
Coffin, Mrs. I. Sherwood
Conkling, Miss Louella B.
Conley, Mrs. A. J.
*Conover, Mrs. Henry S.
Contemporary Club, The
Coutts, Miss Frances H.
Coyne, Mr. J.
Cranford, Miss Margaret
Dana, Mrs. Arnold Guyot
Dann, James E.
Dauernheim, A. M.
Davidson, Mrs. John A.
Decker, Mrs. Charles A.
deComps, Miss Pauline L.
deGersdorff, Mrs. C. A.
Delafield, Mrs. John R.
Devin, Miss M. Catherine
Dickey, Miss Annie Louise
Dithridge, Dr. Louise M.
Ditmas, Miss Caroline
Dodge, Mrs. Francis D.
Dodge, Mrs. Mabel F.
Doman, Mrs. Samuel H.
Drexler, Mrs. Leo S.
Dudley, Miss Frances H.
Duncan, Mrs. Cameron
DuVal, Guy
DuVal, Mrs. Guy
Edinburg, William G.
Ehrenreich, I. Earl
Eidlitz, Mrs. Ernest Frederick
Elbert, Mrs. William
Emerson, Mrs. William
Everit, Mrs. Edward A.
Fairbanks, Miss Maria B.
Farber, Jack H.
Fawcett, Mrs. Alfred
Fawcett, Mrs. James M.
Fawcett, Judge Lewis L.
Firman, Alvin
*Fisher, Miss Edna M.
Fitz-Gibbons, Mrs. Lillian V.
Fitzmaurice, Mrs. G. H.
Fleming, Mrs. M. L.
Flushing Garden Club, Inc.
Fortnightly Library Club
Foshay, Mrs. Addison Y.
Foster, Miss A. M.
Fouse, Mrs. Ralph W.
Fox, Mrs. Mortimer J.
Francis, Mrs. John M.
Fraser, Miss Anna M.
Free, Mrs. Montague
Friedman, Mrs. Morris
Gaillard, Mrs. William Dawson
Garden Club of Madison
Gibson, Miss Gertrude L.
Gimplovitz, Mr. S.
Girls Commercial H. S. Brooklyn
Goetze, Miss Emily H.
Goetze, Mrs. Otto

Goodrich, Mrs. David M.
Goodrich, Mrs. Ernest P.
Gordon, Dr. Onslow A., Jr.
Gorlin, Mr. Philip
Granek, Irving
Granger, Mrs. Roger D.
Great Neck Garden Club
Greenhill, Mrs. Elsie T.
Grey, Mrs. Percy R.
Griffin, George W.
Griffiths, Mrs. Eben
Griffiths, Mrs. Nellie G.
Haas, Miss Edith
Hackedorn, Miss Marion
Haff, Mrs. Alvah C.
Halpin, Mrs. Ella T.
Halsted, Mrs. Henry M.
Hamilton, Mrs. George S.
Hargitt, Dr. Charles A.
Harrington, Mrs. Mary E.
Harris, Mrs. Augustus
Harrisson, Mrs. Stephen M.
Hawes, Dr. Edward S.
Haynes, Miss Mabel
Hearns, Mrs. Frank T.
Hecht, Miss Sadie
Heissenbuttel, Mrs. Henry C.
Heissenbuttel, Mrs. Wm. F.
Heller, Miss Flora
Hevle, Miss Frances M.
Higgins, Dr. Alice K.
Hill, Mrs. Robert C.
Hitchcock, George P.
Hogan, Mrs. Jefferson
Holl, Mrs. Marie
Holme, A. L.
Hooker, Mrs. Elon H.
Hope, Miss Mary
Houts, Miss Margaret M.
Hunsicker, Mrs. John Q.
Ingraham, Miss Grace
Ingraham, Dr. Ruth
Irish, William S.
Jacobs, Harry
Jadwin, Mrs. Stanley P.
Jaeger, John J.
Jaffe, Mrs. B. G.
James, Mrs. John Wells
James Madison High School Biology Department
James, Mrs. Warner
James, William L.
Jansen, Miss Dora
Jenkins, Miss Bertha E.
Johnston, Mrs. F. Cliffe
Johnston, Miss Florence
Jones, Miss Helen Swift
Jones, Mrs. Wallace T., Jr.
Judd, Mrs. Orrin R.
Kahn, Miss Julianna B.
Katz, Sidney
Keating, Miss Margaret R.
Keil, Mrs. Frieda M.
Kelley, Mrs. Herman A.
Kent, Mrs. H. L.
Kindergarten Mother's Club, P. S. 241
Kirk, The Misses
Kishor, Mr. Matthew
Knox, Miss Maria
Koeniger, Mrs. J. F.
Kolk, Dr. Laura A.
Kosniski, Mr. Marian M.
Kunz, Mrs. M. R.
Lacher, Miss Esther
Lack, Mrs. Frederick R.
Lafrentz, Miss Olga L.
Laing, Mrs. M. Robertson
Lane, Miss Ella M.
Laura Stewart Garden Club
Lawrence, Mrs. Herbert
Lensman, Oscar
Lester, Mrs. Maxwell
Lethbridge, Miss Ethel M.
Levingson, Isaac
Lewis, Mrs. Florence
Lienau, Mrs. Rudolph S.
Lines, Dr. Mary L.
Lockwood, Mrs. William A.
Lohman, Mrs. W. H.
Loines, Miss Elma
Loines, Mrs. Stephen

Love, John H.
Lyons, Miss Mary V.
Mack, Mrs. Minnie D.
Mackey, Mrs. Malcolm S.
Maclean, Mrs. Donald
Maguer, Mrs. Thomas F.
Maher, Mrs. Sarah A.
Mahr, Miss Mildred J.
Manville, Mrs. H. Edward
Marchlewski, Mr. Henry
Marine Park Garden Club
Markell, Mr. Maurice J.
Marshall, Mrs. William W.
Maynard, Mrs. Edwin P.
McCarthy, Miss Mildred H.
McGahen, Mrs. Rufus E.
McLaren, James R.
Meehan, Mr. Bernard R.
Mellen, Mrs. Graham K.
Melville, Miss Belle J.
Merritt, Miss Lilla H.
Meserole, Mrs. Walter M.
Meyenborg, Miss Evelyn A.
Moore, Miss Jane L.
Moorehead, Mrs. Wm. H.
Morgan, Miss Charlotte E.
Mudge, Mrs. Alfred E.
Müller, Adolf
Mutchler, Miss Marjorie
Myerson, Mrs. M. C.
Namm, Major Benjamin H.
New Utrecht Garden Club
Oak, Miss Dorothy
Oakes, Miss Fannie
O'Connell, John
O'Donohue, Mrs. Charles A.
Ohly, Dr. John H.
Ormsbee, Mrs. Malcolm H.
Osborne, Mrs. Dean C.
Otis, Mrs. Charles H.
Paffard, Mrs. Frederic C.
Parent Teachers' Association, P. S. 241
Parker, Mrs. Elizabeth B.
Parshelsky, Moses L.
Pashley, Mrs. Charles L.
Patterson, Dr. William M.
Peak, Mrs. Eleanor
Peck, Mrs. Bayard L.
Peloubet, Mrs. S. W.
Pendleton, Mrs. Frederick S.
Penny, Mrs. J. H.
Perkins, Mrs. Charles E.
Perry, Mrs. John M.
Peters, Mrs. Wm. Sterling
Phragman, Mrs. Eleanor B. C.
Platt, Rutherford
Plumb, Mrs. E. T.
Pond, William H.
Post, Mrs. James H.
Post, Miss Jessie W.
Potter, Mrs. R. Burnside
Pratt, Abram J.
Pratt, Frederic B.
Pratt, Mrs. Katherine Sloan
Pratt, Mrs. Richardson
Prest, Mrs. Charles S.
Price, Frank J.
Prince, Mrs. Benjamin
Prince, Mrs. Julius
Provost, Miss Eva M.
Public School 18, Brooklyn
Public School 19, Brooklyn
Public School 42, Brooklyn
Public School 105, Brooklyn
Public School 122, Brooklyn
Public School 158, Brooklyn
Public School 197, Brooklyn
Rabinoff, Mrs. George W.
Radcliffe, Miss Phyllis S.
Recknagel, Miss Alice
Reed, Mrs. George M.
Reinhardt, Mrs. Charles
Rich, Mrs. Ruth H.
Richardson, William C.
Rinaldo, Joseph A.
Rinschede, Miss Ida E.
Roe, Mrs. Clinton T.
Roehl, Mrs. Winslow J.
Rogers, Miss Matilda
Roghé, Miss Hedwig
Rogovin, Mrs. Dora Ann

Romanovsky, Mr. Dimitri
Romer, Miss Caroline S.
Rose, Mrs. Gertrude B.
Rothberg, Mrs. Mina
Rothmaler, Miss Ernita
Rothman, Mrs. Blanche G.
Rowe, Mrs. Frederick W.
St. Joseph's College for Women
Sanders, Edward I.
Scheele, Mrs. William
Schiff, Miss Jennie
Schilback, Mrs. Harold F.
Scholl, Miss Katherine
Schwarz, Mrs. Henry F.
Segeler, Mrs. Louise
Selman, Mrs. Anna
Shaw, Miss Agnes M.
Shaw, Mrs. Awbrey N.
Sheff, Mrs. Henrietta
Shepard, Charles S.
Sherman, Mrs. Arnold W.
Siebert, Mrs. William
Siegel, Mrs. Lillian
Simpson, Miss Etta
Smith, Miss Bertha H.
Smith, Miss Leona A.
Smith, Sidney
Smith, Mrs. Townsend J.
Softler, Mrs. Viola
Spingarn, Mrs. J. E.
Staber, Miss Maud J.
Steele, Mrs. Daniel C.
Steele, Roswell H.
Stellwagen, Fred L.
Sterling, Mrs. Robert D.
Stettner, Mrs. Helen
Stewart, Miss E. Grace
Stires, Mrs. Ernest M.
*Stout, Mrs. Charles H.
Strong, Homer
Sullivan, Miss Bessie
Swan, Joseph R.
Swimm, Mrs. Charles T.
Tainter, Miss Grace
Terwilliger, Mrs. E. C.
Thacher, Mrs. A. B.
Thatcher, Mrs. John H.
Thirkield, Mrs. G. H.
Tiebout, Mrs. Cornelius H.
Tiktin, Mrs. Zosia
Tilley, Dr. R. McFarlane
Tompkins, Miss Elizabeth M.
Tousey, Miss Elizabeth
Towl, Mrs. F. M.
Troeck, Miss M. Dorothy
Turner, Mrs. Henry C.
Vail, Harry C.
Valentine, Stephen
VanBrunt, Miss Elizabeth R.
VanHoesen, Mrs. Stephen G.
VanSinderen, Mrs. Adrian
Vietor, Mrs. Ernest G.
von Grebenstein, Mrs. E. E.
vomLehn, Mrs. Richard
Wallace, Mrs. Charles F.
Wandel, Carleton
Wark, Charles F.
Warner, Miss Elma
Warren, William H.
Wayman, Robert
Wells, Mrs. Walter F.
White, Mrs. Alexander M.
Whittier, Mrs. Thomas T.
Willard, George N.
Williams, Mrs. John O.
Wills, Louis Charles
Wilson, Mrs. Francis A.
Wise, Mrs. Alfred F.
Wolff, Mrs. Emily
Wood, Mrs. Willis D.
Woodward, Miss Mary Blackburne
Woolley, George I.
Young, Miss Abigail
Zadde, Mrs. Augusta
Zatz, Mrs. Gertrude B.
Zellner, Mrs. Carl P.
Zimmele, Charles F.
Zimmer, Mrs. Wilson Briggs

SUMMARY OF MEMBERSHIP

Benefactors		15
Patrons		17
Donors		29
Permanent Members		72
Life Members		
Through the Botanic Garden	19	
Through Other Departments	180	199
Contributing Members		51
Sustaining Members		
Through the Botanic Garden	18	
Through Other Departments	196	214
Annual Members		397
Total, as of April 25, 1942		994

The Brooklyn Institute of Arts and Sciences

Officers of the Institute

Chairman, Board of Trustees
EDWARD C. BLUM

President
JAMES G. McDONALD, LL.D.[1]
ADRIAN VAN SINDEREN[2]

First Vice-President
WALTER H. CRITTENDEN

Second Vice-President
CHARLES PRATT

Third Vice-President
SIDNEY W. DAVIDSON

Treasurer
EDWIN P. MAYNARD

Secretary
FRANCIS T. CHRISTY

Botanic Garden Governing Committee

MISS HILDA LOINES, *Chairman*

PHILIP A. BENSON, *Vice-Chmn.*
EDWARD C. BLUM, *Ex officio*
WILLIAM G. CREAMER
WALTER H. CRITTENDEN
LEWIS L. FAWCETT
MRS. LEWIS W. FRANCIS
WALTER HAMMITT
WILLIAM T. HUNTER
JAMES G. McDONALD
EDWIN P. MAYNARD
ROBERT MOSES, *Ex officio*
ALFRED E. MUDGE
ADRIAN VAN SINDEREN, *Ex officio*

Ex Officio Members of the Board

The Following Officials of the City of New York

THE MAYOR
THE COMPTROLLER
THE COMMISSIONER OF PARKS

GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Main 2-4433.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or McDonald-Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

[1] Resigned as of March 1, 1942.
[2] Beginning as of March 1, 1942.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Paper:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50, plus postage.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk: A study of grassland and forest. By Norman Taylor, June 11, 1923. 108 pages. $1.00, plus postage.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 93. Notes on the Tennessee Flora. By H. K. Svenson. 50 pages. 1941.

No. 94. Inheritance of smut resistance in some oat hybrids. By George M. Reed. 7 pages. 1941.

No. 95. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1940. By Arthur Harmount Graves. 8 pages. 1941.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 9. The Rose Garden of the Brooklyn Botanic Garden. 12 illustrations, folded map. By Montague Free. Price, 50 cents.

Guide No. 10. Gardens within a garden: A general guide to the grounds of the Brooklyn Botanic Garden. Second Edition. 57 pages; 21 illustrations. Folded map. By C. Stuart Gager. Price, 25 cents; by mail, 30 cents.

Guide No. 11. List of shrubs, exclusive of conifers, growing outdoors in the Brooklyn Botanic Garden. 32 pages; 5 illustrations. By Charles F. Doney. Price, 25 cents; by mail, 30 cents.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail 30 cents.

Guide No. 13. Trees in the Brooklyn Botanic Garden. 53 pages; 9 illustrations. By Alfred Gundersen and Arthur H. Graves. Price, 25 cents; by mail, 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

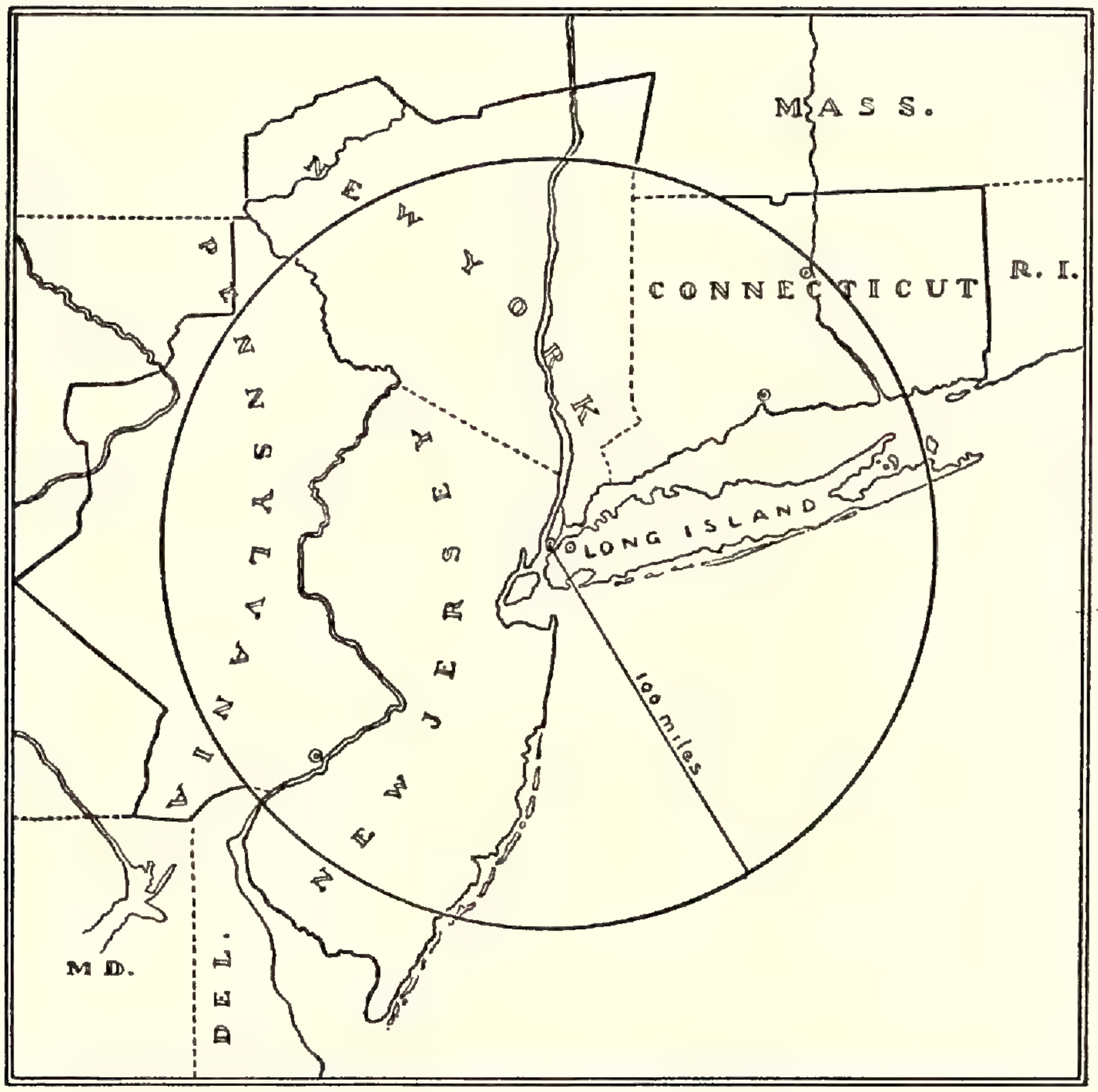
GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI JULY, 1942 NO. 3

THE LOCAL FLORA SECTION
(NATIVE WILD FLOWER GARDEN)
OF THE
BROOKLYN BOTANIC GARDEN

GUIDE NO. 14



PUBLISHED QUARTERLY

BROOKLYN BOTANIC GARDEN

Scientific, Educational, and Administrative Officers

SCIENTIFIC AND EDUCATIONAL

The Staff

C. STUART GAGER, Ph.D., Sc.D., Pd.D., *Director*
MONTAGUE FREE, Certificate, Royal Botanic Gardens, Kew, *Horticulturist*
ARTHUR HARMOUNT GRAVES, Ph.D., *Curator of Public Instruction*
ALFRED GUNDERSEN, Docteur de l'Université (Paris), *Curator of Plants*
WILLIAM E. JORDAN, B.S., *Librarian*
GEORGE M. REED, Ph.D., *Curator of Plant Pathology*
ELLEN EDDY SHAW, M.A., *Curator of Elementary Instruction*
HENRY K. SVENSON, Ph.D., *Curator of the Herbarium*
MARGARET M. DORWARD, A.B., *Assistant Curator of Elementary Instruction*

Other Officers

MARY AVERILL, *Honorary Curator of Oriental Gardening and Floral Art*
HAROLD A. CAPARN, *Consulting Landscape Architect*
ELIZABETH REMSEN VAN BRUNT, *Honorary Curator of Culinary Herbs*

RALPH CURTISS BENEDICT, Ph.D., *Resident Investigator (Ferns)*
RALPH H. CHENEY, Sc.D., *Resident Investigator (Economic Plants)*

G. ELIZABETH ASHWELL, A.B., *Curatorial Assistant*
MICHALENA LEFRERE CARROLL, *Instructor*
EMILIE PERPALL CHICHESTER, *Library Assistant*
ELIZABETH CLARKE, A.B., *Curatorial Assistant*
CHARLES F. DONEY, M.S., *Assistant in Woody Plants*
WILLIAM H. DURKIN, *Curatorial Assistant*
ELSIE TWEMLOW HAMMOND, M.A., *Instructor*
FRANCES M. MINER, M.A., *Instructor*
HESTER M. RUSK, A.M., *Instructor*
MARGERY H. UDELL, *Curatorial Assistant*
L. GORDON UTTER, M.S., Ph.D., *Research Assistant*
JEANNE PHYLLIS WALTHER, A.M., *Research Assistant*

LOUIS BUHLE, *Photographer*
MAUD H. PURDY, *Artist*

ADMINISTRATIVE

THOMAS A. DONNELLY, *Secretary and Accountant* [1]
EDNA PALMITIER SCHACHT, *Acting Secretary* [2]
JANE E. COFFIN, *Office Assistant*

MARIE-LOUISE HUBBARD, A.M., *Secretary to the Director*
FRANK STOLL, *Registrar and Custodian*

LAURA M. BREWSTER, *Stenographer*
VIRGINIA A. CLAY, *Stenographer*
CONSTANCE PURVES ELSON, B.A., *Stenographer*
LORRAINE LAROCHE, *Stenographer*
BETTY G. RILEY, *Stenographer*

Published Quarterly at Prince and Lemon Streets, Lancaster, Pa.
by the Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y.
Entered as second-class matter in the post-office at Lancaster, Pa., under act of August 24, 1912

[1] Absent on U. S. Government duty, from April 1, 1942.
[2] Beginning April 1, 1942.

FIG. 1. View, early spring of 1942, looking north across pond and sand-barren.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI JULY, 1942 NO. 3

THE LOCAL FLORA SECTION (NATIVE WILD FLOWER GARDEN) OF THE BROOKLYN BOTANIC GARDEN[1]

GUIDE NO. 14

BY HENRY K. SVENSON

This "Garden within a Garden," begun in the spring of 1911, now has approximately five hundred species represented. The present reconstruction upon an ecological basis was started in 1931. Only those plants have been introduced which occur wild within approximately 100 miles of the City, an area representing the range of the Torrey Botanical Club; such European importations as the dandelion (two species), the white daisy, buttercups, and clover, and such other exotics as the burdock, pigweed, and chickweed are not intentionally grown in this area. Our section occupies about two acres on the southern slope of the terminal glacial moraine which runs the length of Long Island, and possibly a fragment of the "flat woods" of the outwash plain which extends southward to the ocean and which gave the English name of Flatbush to the Dutch village previously known as Midwout (Middlewoods). As early as the Battle of Long Island, which took place in 1776 on these same hills, the trees had been cut off; but fragments of the forest, still to be found to the eastward, in Queens County, show a vegetation much richer than that of other parts of Long Island. Enormous red oaks and tulip trees (*Liriodendron*) towered over the un-

[1] The map on the front cover page is of the Torrey Botanical Club range —approximately 100 miles radius from New York City.

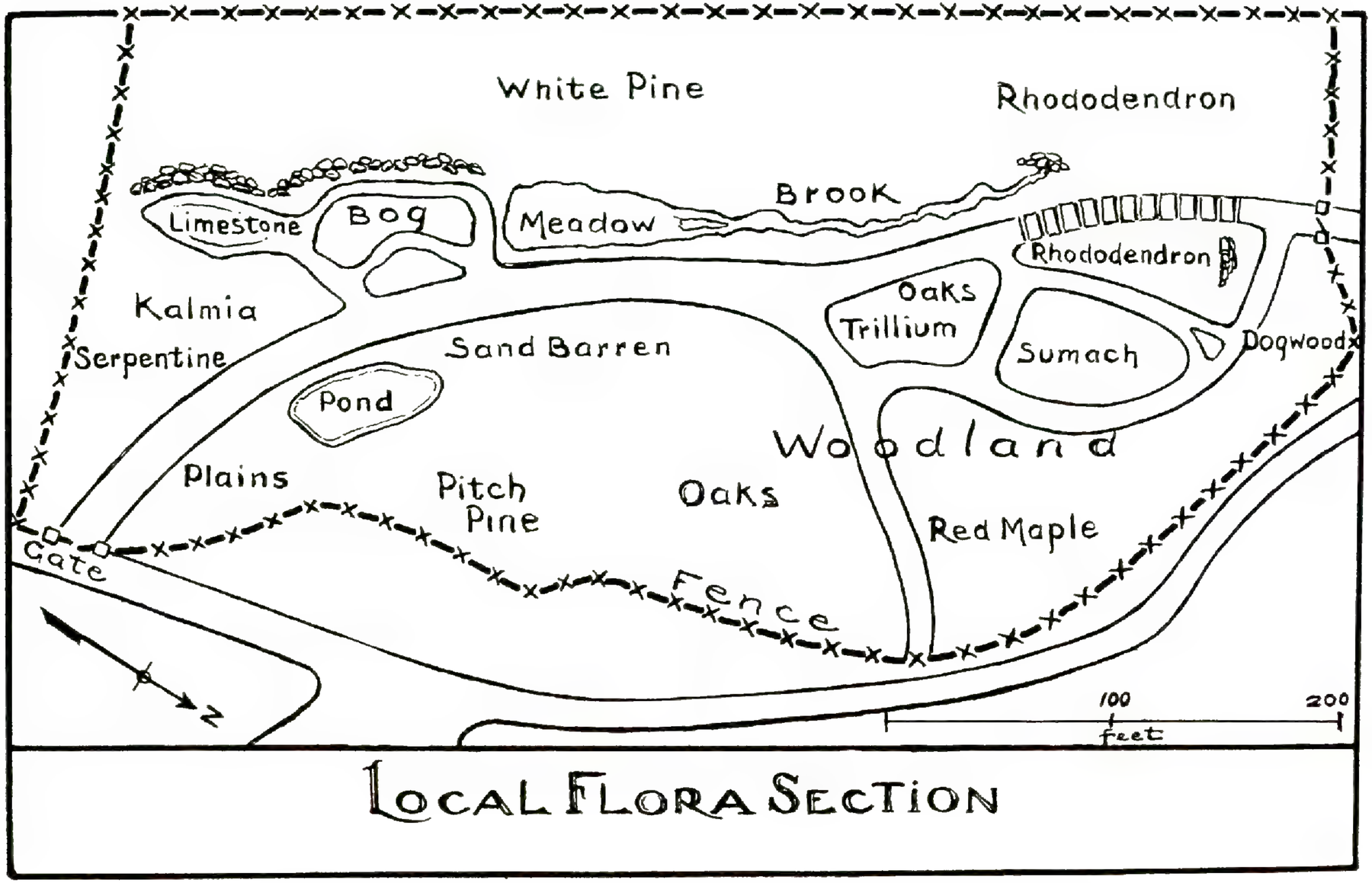


FIG. 2. Map of Local Flora Section (Native Wild Flower Garden).

dergrowth of flowering dogwood (*Cornus florida*) and black haw (*Viburnum prunifolium*); the depressions, often partially occupied by little ponds, had swamp oak (*Quercus palustris*), sweet gum (*Liquidambar*), red maple (*Acer rubrum*), and downy poplar (*Populus heterophylla*). The violet wood-sorrel (*Oxalis violacea*), round-leaved violet (*Viola rotundifolia*), bloodroot (*Sanguinaria*), and maidenhair-fern (*Adiantum*) still persist in the neighborhood of Jamaica (Queens), and emphasize the close affinity with the rich forests of the mainland.

As may be seen from the accompanying photographs, the characteristic plants of each of the ecological areas of the vicinity of New York are shown in a natural, if somewhat miniature, setting. Many of our native plants are strictly limited in occurrence and grow only in certain types of soil or on definite kinds of rocks. Many species are confined to outcrops of serpentine, or to ledges of limestone; others are to be found only in the white sands of the New Jersey pine barrens and their extension into southern Long Island (Fig. 3B).

The varied types of flowering plants in this manner reflect the diverse geology of the New York region. These geological areas extend in a southwest-northeast direction in conformity with the trend of the Appalachian Mountains, as follows:

1. *A zone of crystalline rocks* characteristic of the sterile uplands of New England, and well represented in the Hudson Highlands, the Ramapo Mountains, and the summits of the Kittatinny Mountains. It is characterized by scarlet and chestnut oaks (*Quercus coccinea* and *Q. Prinus*), thickets of blueberry (*Vaccinium*), sweet fern (*Myrica asplenifolia*), and mountain laurel (*Kalmia*), but there is a great lack of the colorful spring flowers to be found in the richer soils of the lowlands or of the limestone areas.

2. *The sandy coastal plain,* which forms the pine barrens of southern New Jersey and Long Island (Fig. 3B), and extends northward to Cape Cod and the tip of Nova Scotia. Off the New England coast the greater part has been submerged in post-Glacial time, a fact which explains the broken range of such plants as the curly-grass fern (*Schizaea pusilla,* Fig. 4, Map 4). This zone has the most interesting vegetation of our entire region; it is continuous with the Coastal Plain of Florida and the Carolinas, and has close

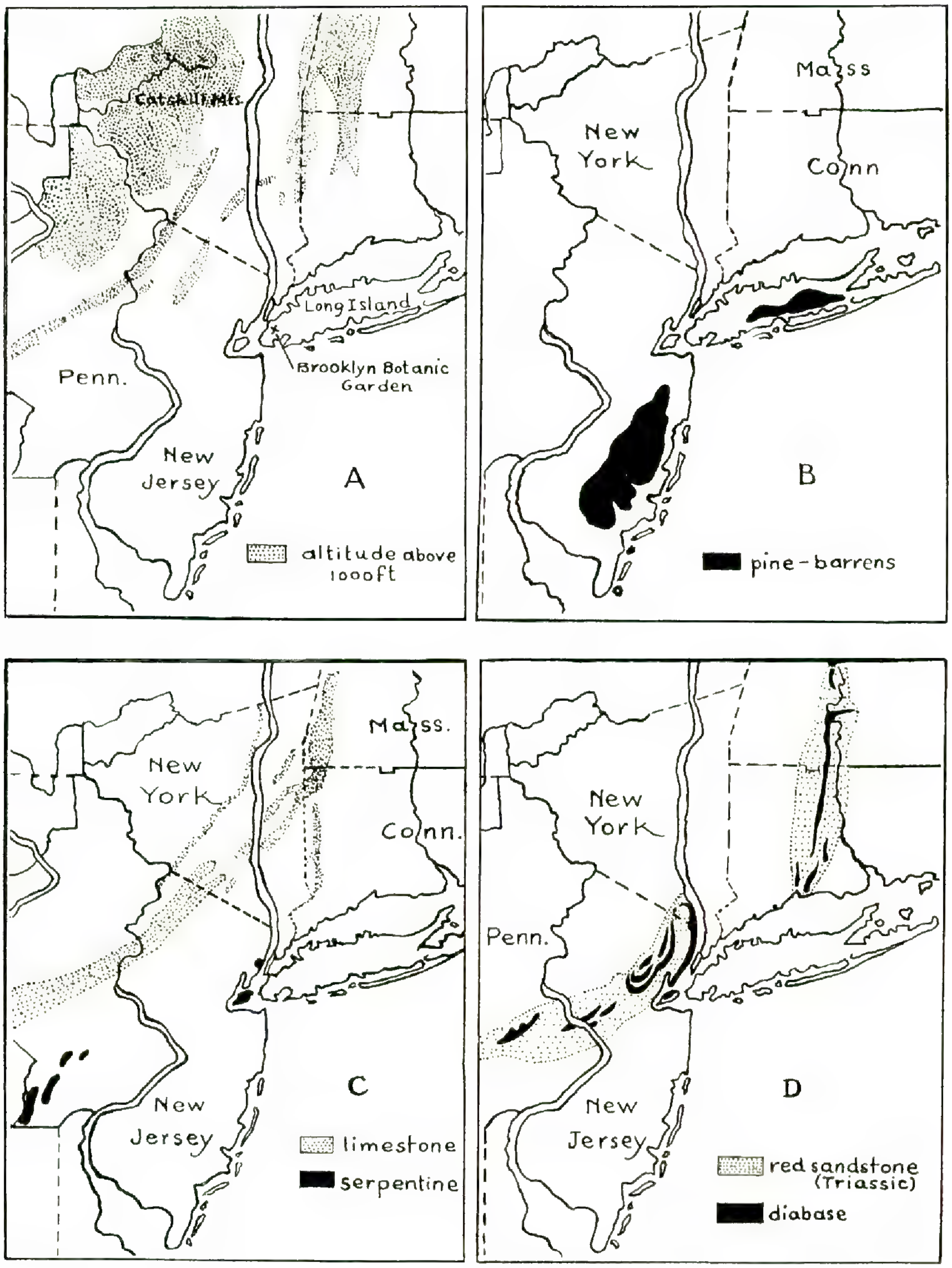


FIG. 3. Geological and physiographic features of the vicinity of New York showing: A. Region above 1000 ft. altitude characterized by northern (Canadian) plants. B. Pine barrens of New Jersey and Long Island. C. Limestone and serpentine areas. D. Red sandstone and diabase.

association with the vegetation of the West Indies. Some plants of the Coastal Plain are occasionally found in the interior, as for example *Helonias bullata* (Fig. 11*e*), at Budd's Lake in New Jersey. And some have widespread range to the northward such as the ornamental *Corema Conradii,* which is known in our area only from the New Jersey pine barrens, and from exposed quartzite ledges on the Shawangunk Mountains of southern New York. *Hudsonia* (Fig. 8*d*) is distributed in sand dunes about the Great Lakes, as well as in our coastal dunes and sand barrens. The number of interesting plants found in our area only in the pine barrens is large, and only a few can be mentioned.

3. *Limestone.*—Outcrops of limestone (Fig. 3C) extend from the Shenandoah Valley in Virginia into western New Jersey and across the Hudson River into western Massachusetts and western Connecticut. The friable texture of limestone and its attractive weathering make it the ideal stone for rock gardens, and provide a foothold for walking-fern (*Camptosorus*), wall-rue (*Asplenium Ruta-muraria*), and the cliff brakes (*Pellaea atropurpurea* and *P. glabella*); and for many flowering plants such as the sharp-lobed hepatica (*Hepatica acutiloba,* Fig. 13*d*) and the scarlet fire-pink (*Silene virginica,* Fig. 6*a*), which barely comes into our area. Rich woods and swamps bordering such limestone outcrops frequently have an abundance of orchids: the large and small varieties of the yellow lady's slipper (*Cypripedium pubescens*); the showy lady's slipper (*Cypripedium hirsutum*), the most spectacular of all our native plants and still to be found in one or two swamps in western New Jersey; and the showy orchid (*Orchis spectabilis*). And scarcely a swamp can be found in this limestone area which does not have a supply of fringed gentian (*Gentiana crinita*) in the fall.

4. *Serpentine.*—This is a soft greenish rock containing magnesium. Several square miles occur on Staten Island (Fig. 3C), and a few small lenses to the northeast, but the barrens which extend southwest from Philadelphia to the Delaware line are by far the best representation in our area. From these barrens have come the well-known *Phlox subulata* (Fig. 6*b*), now cultivated in a great variety of forms; *Cerastium arvense,* especially the large-flowered var. *villossissimum* (Fig. 6*c*), known only from these barrens; a yellow clematis (*C. ochroleuca*); a small-flowered white aster (*A.*

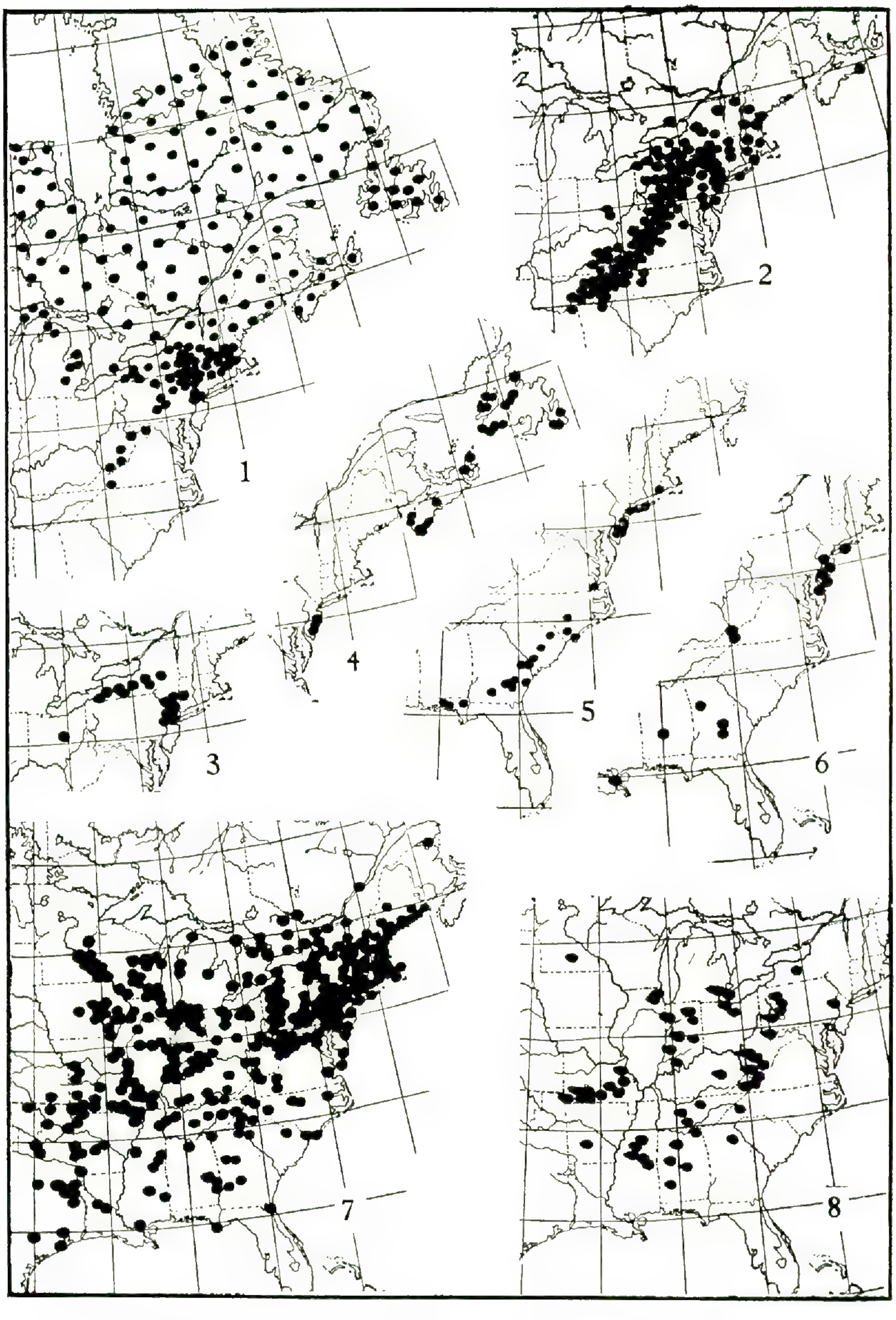


FIG. 4. Ranges of representative native plants. Explanation on opposite page.

depauperatus), also confined to the serpentine barrens; and a yellow-flowered tall Euphorbia (*E. Darlingtonii*).

5. *Red sandstone.*—This sandstone (Fig. 3D), of Triassic Age, is found extensively in eastern New Jersey and extends into the southernmost part of New York; it reappears in the Connecticut Valley. For rock gardens it is nearly as good as limestone and, like the limestone, it supports a fairly rich flora. The walking-fern, for example, occurs occasionally on damp outcrops of this sandstone. Much of the surface area has been destroyed by farming and by building operations, so the original vegetation has largely disappeared in many sections.

6. *Diabase.*—This rock (Fig. 3D) forms the Palisades of the Hudson River, and occurs in several similar ridges extending eastward to the valley of the Connecticut River. All have erupted

---

FIG. 4.—Ranges of representative native plants.

Map 1. Black spruce (*Picea mariana*), a northern tree extending northwestward to Alaska. The stations in central and southern New England are from a map by R. J. Eaton in *Rhodora*, Vol. 33, p. 96. 1931.

2. *Rhododendron maximum*, a shrub of Alleghenian distribution with infrequent outlying stations northward as far as Nova Scotia. It has been extinct for a long time at the Long Island locality.

3. The globe-flower, *Trollius laxus* (see also fig. 10*d*), apparently confined to the limestones and sandstones of New York State, and northwestern Connecticut, and with an old record in Ohio. It represents a species of very limited distribution.

4. The curly-grass fern, *Schizaea pusilla* (see also fig. 14), a member of a tropical group probably once occupying the now-submerged coastal plain between Nova Scotia and New Jersey. Map from M. L. Fernald in Rhodora, Vol. 35, p. 86. 1933.

5. The pine-barren sandwort, *Arenaria caroliniana*, illustrating a species of restricted coastal-plain distribution. Map from M. L. Fernald in Rhodora, Vol. 39, p. 349. 1937.

6. *Zygadenus leimanthoides*, a species of the coastal plain, with a few restricted stations in the Appalachian Mountains.

7. The cardinal flower, *Lobelia cardinalis*, illustrating a species of broad, general distribution. Map from R. McVaugh in Rhodora, Vol. 38, p. 276. 1936.

8. The fire pink, *Silene virginica*, illustrating a species barely entering our area from the southwest.

These maps have been made from data on herbarium specimens and records in various publications.

FIG. 5. View, early spring of 1942, looking northwest along brook.

through the red sandstone and frequently show the columnar or staircase formations which give it the name of "trap" rock. It is rich in minerals and supports a number of plants, such as the walking-fern, bladder-nut (*Staphylea trifolia*), purple clematis (*Clematis verticillaris*), and bluebells (*Campanula rotundifolia*), which are most frequently found on limestone. Neither the sandstone nor the diabase is represented in the Local Flora Section, since their characteristic plants are found also on the limestone and serpentine outcrops, but enormous boulders of the diabase, transported by glacial action, are frequent in the terminal moraine of the Garden. (See Brooklyn Botanic Garden, Guide No. 7, 1932.)

7. *Mountain area.*—North of the Carolinian (coastal-plain) and the Alleghenian zone of deciduous trees is the Canadian forest of spruce (*Picea*) and fir (*Abies*), yellow and paper birches (*Betula lutea* and *B. papyrifera*), and an undergrowth of small plants or little shrubs familiar to all vacationers in northern New England, the Catskill Mountains, and the Adirondacks: the bunchberry (*Cornus canadensis,* Fig. 9*c*), the twin-flower (*Linnaea borealis*), creeping snowberry (*Chiogenes*), painted trillium (*Trillium undulatum*), the hobble-bush (*Viburnum alnifolium*), and rhodora (*Rhododendron canadense*). These follow, in general, the range of the black or bog spruce (*Picea mariana*), of which the eastern distribution is shown in Fig. 4, Map 1; but they do not extend so far northward. The black spruce penetrates farther into the arctic than any other tree of eastern America. In our area these plants are only rarely found below the 1000 ft. level, as shown in Fig. 3A, such lowland occurrences being usually in spruce bogs.

Guide to the Plantings of the Local Flora Section

The last trace of original vegetation disappeared from the Botanic Garden area long ago, and all plants have been brought in from the outside, either by collection, gift, or purchase. Before the Brooklyn Botanic Garden was established, in 1910, a border mound had been constructed along Flatbush Avenue, and this border mound now cuts off much of the noise of traffic and the distracting sights of that thoroughfare. The border mound, as well as other portions, was heavily planted with privet, weigela, and other Old World shrubs and trees, and our reconstruction work has required

their gradual elimination. Now, after ten years, this task is practically accomplished. Some of the plant habitats have not yet been completed; for example, the limestone ledge was installed only in the spring of 1942, and the area occupied by red maples will be partially excavated to provide swamp conditions.

As one enters the gateway opposite the lilacs (Fig. 2), the bank of serpentine rock will be seen on the left. This rock was obtained from Staten Island through the kindness of Miss Hilda Loines, of the Botanic Garden Governing Committee. In addition to the plants mentioned (p. 187) as specially characteristic on serpentine, this area includes the bluebell (*Campanula rotundifolia*), which likewise grows abundantly on the diabase of the Palisades of the Hudson River; sundrops (*Oenothera fruticosa*); blue-eyed grass (*Sisyrinchium mucronatum*, Fig. 6*d*); *Thalictrum revolutum*; *Senecio obovatus*; *Galium boreale*; and the shooting-star (*Dodecatheon Meadia*, Fig. 6*e*). The last-named species extends northward to Montgomery County, Pennsylvania, and so, with a distribution somewhat like that of *Silene virginica* (Fig. 6*a*), barely reaches our area; it grows chiefly on limestone and is variable in color, being represented in large areas of the South by pure white flowers which do not differ in any other way from the lavender-to-pink forms usually seen.

Continuing along the bank beyond the serpentine area, one sees a group of ericaceous plants, including a good stand of mountain laurel (*Kalmia latifolia*) which represents the oldest existing plantation in the area, having been set out about 1912. Associated with it is the sheep laurel (*Kalmia angustifolia*), which, when grown under suitable conditions in a sandy soil without overcrowding, is an ornamental shrub with a wealth of bright pink flowers. At the base of the mountain-laurel bank will be found trailing arbutus (*Epigaea repens*, Fig. 7*a*), one of the earliest of our spring flowers. Some of the clumps have been growing robustly for five years or more, but they are greatly subject to winter damage. Associated with the mountain-laurel also are our native species of azalea (*Rhododendron nudiflorum* and *R. rosea*) and the dwarf blueberries (*Vaccinium pennsylvanicum* and *V. canadense*).

On the right side of the grass path, opposite the serpentine, is an area labeled "plains" on the map, which represents a natural prairie

FIG. 6. Plants of serpentine and limestone. *a*, fire pink (*Silene virginica*); *b*, *Phlox subulata*; *c*, *Cerastium arvense*; *d*, *Sisyrinchium mucronatum*; *e*, *Dodecatheon Meadia*.

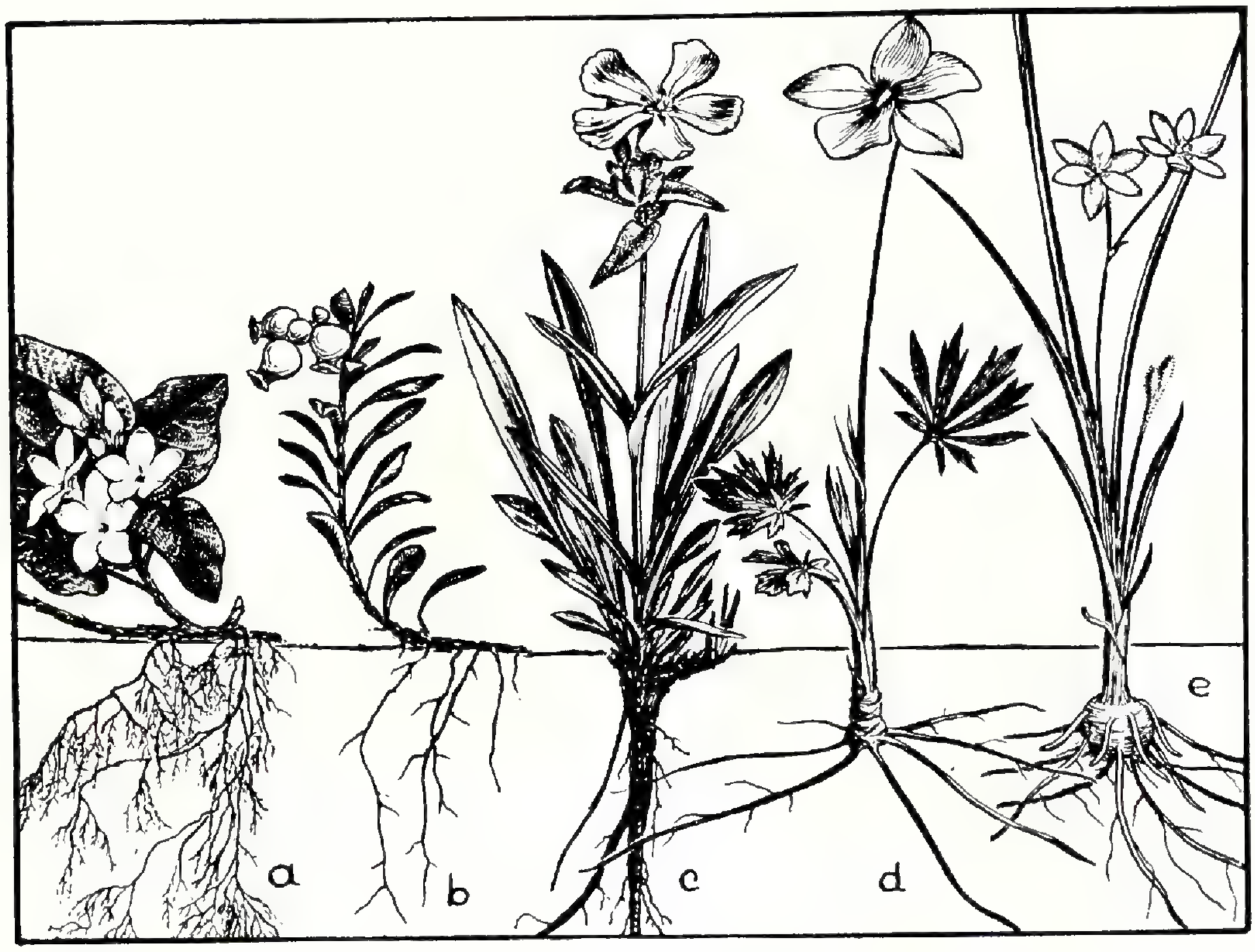


FIG. 7. Plants of sandy places. *a*, trailing arbutus (*Epigaea repens*); *b*, bearberry (*Arctostaphylos Uva-ursi*); *c*, *Silene pennsylvanica*; *d*, bird-foot violet (*Viola pedata*); *e*, yellow star-grass (*Hypoxis hirsuta*).

in western Long Island, known as the Hempstead Plains. This prairie originally covered at least sixteen thousand acres, but air fields and suburban dwellings are encroaching upon it, so that its obliteration as a natural feature is at hand. (For views of the Hempstead Plains see the *Brooklyn Botanic Garden Record,* Vol. XXV, No. 3, 1936). In the spring, before the *Andropogon* grass has had time to elongate, the bird-foot violet (*Viola pedata,* Fig. *7d*) is still abundant enough in a few places to make a blue haze on the landscape. The white spikes of *Aletris farinosa* and the yellow clumps of wild indigo (*Baptisia tinctoria*) come later in the summer. Among other interesting plants of this area are yellow star-grass (*Hypoxis hirsuta,* Fig. *7e*), *Lyonia mariana,* the dwarf willow (*Salix tristis*), sand cherry (*Prunus pumila*), a yellow rock-rose (*Helianthemum dumosum*), and *Viola Mulfordae* (a hybrid between *V. fimbriatula* and *V. Brittoniana*). A truckload of turf obtained last winter from one of the best remaining areas in the Plains gives us a replica of the vegetation.

Still to the right of the grass pathway is a shallow pond of elliptic shape, representing the sand-rimmed kettle-hole ponds in the glaciated area of Long Island. This contains such aquatics as the golden club (*Orontium*), pickerel-weed (*Pontederia*), the small-flowered pond lily (*Castalia odorata* var. *minor*), *Coreopsis rosea, Gratiola aurea,* and forms of the arrowhead (*Sagittaria latifolia*). On the sandy border are *Stachys hyssopifolia,* a tuberous-rooted mint characteristic of the coastal-plain; various species of native *Lespedeza; Hypericum densiflorum,* now known also from Long Island as well as from the New Jersey pine barrens; the magenta-flowered *Rhexia virginica;* and *Hemicarpha micrantha,* a minute globular sedge found on sandy shores. On the far side of the pond is a plantation of pitch pine (*Pinus rigida*) interspersed with beach plum (*Prunus maritima*), bayberry (*Myrica carolinensis*), sweet-fern (*M. asplenifolia*), and other thicket-forming shrubs.

Bordering this pond to the westward and also fringed by the pitch pines is an area of dry white sand, approximately eight to twelve inches deep and overlying the original clay-loam. At first such sand was obtained from the New Jersey pine-barrens and from similar barrens of Long Island; but it has been found that

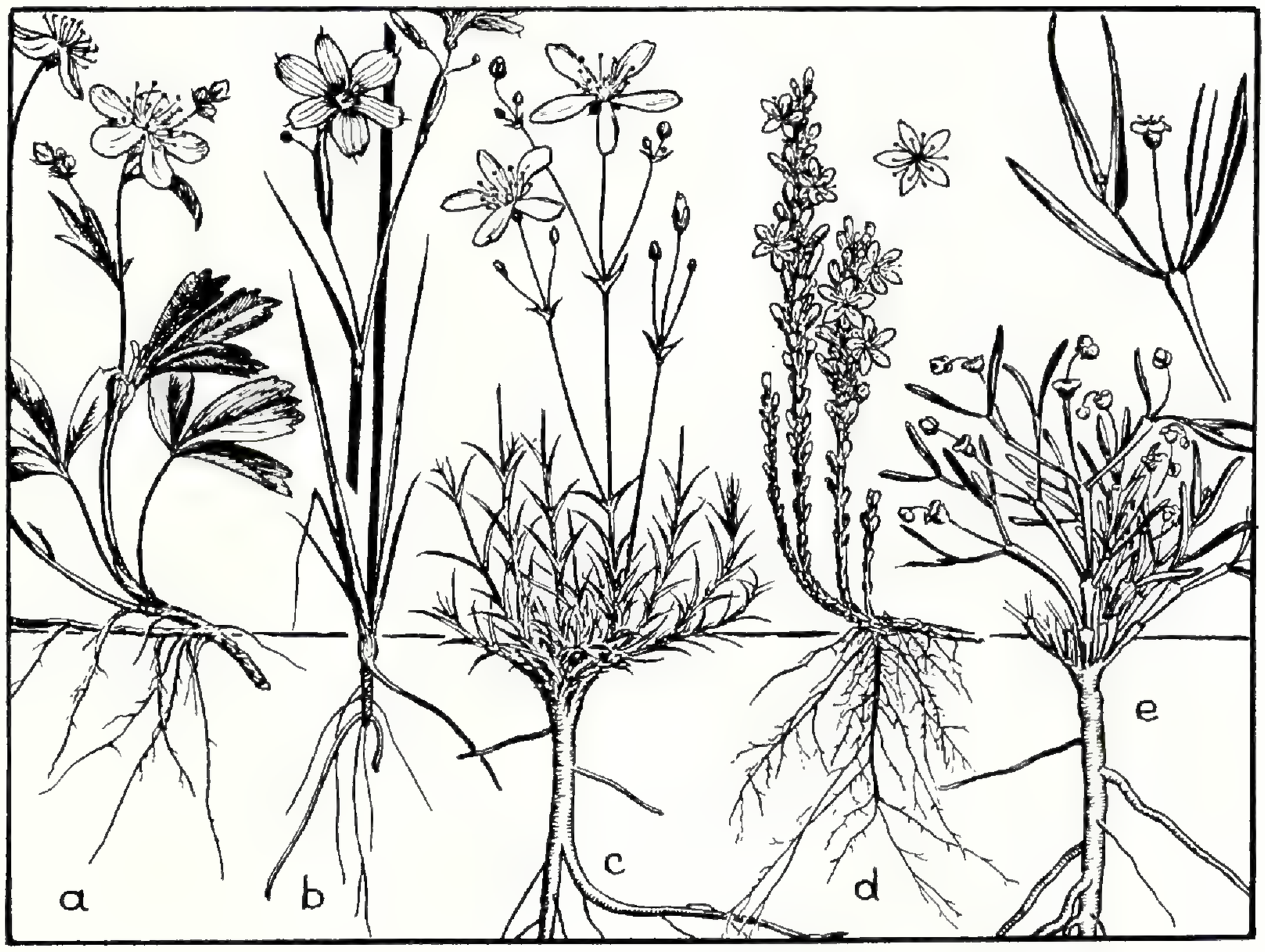


FIG. 8. Plants of sand-barrens. *a*, three-toothed cinquefoil (*Potentilla tridentata*); *b*, blue-eyed grass (*Sisyrinchium arenicola*); *c*, *Arenaria caroliniana*; *d*, *Hudsonia ericoides*; *e*, ipecac spurge (*Euphorbia Ipecacuanhae*).

FIG. 9. Woodland plants, chiefly northern. *a*, twisted-stalk (*Streptopus roseus*); *b*, golden alexanders (*Zizia aurea*); *c*, bunchberry (*Cornus canadensis*); *d*, goldthread (*Coptis trifolia*); *e*, *Clintonia umbellulata*.

quartz sand, which can be bought from local dealers, produces just as good results. The root-systems of these sand-barren plants are generally of two sorts: either thread-like roots which branch far and wide, as in the species of Hudsonia (*H. ericoides*, Fig. 8*d*, and *H. tomentosa*), the broom crowberry (*Corema Conradii*), and the bearberry (*Arctostaphylos Uva-ursi*, Fig. 7*b*); or long tap roots, such as characterize the pine-barren sandwort (*Arenaria caroliniana*), or the flowering spurge (*Euphorbia corollata*), or the ipecac spurge (*Euphorbia Ipecacuanhae*, Fig. 8*e*), a species of wondrous variability in color and shape of leaves. In this sand barren will also be found a species of blue-eyed grass (*Sisyrinchium arenicola*, Fig. 8*b*), which is abundant on Long Island, three species of milkweed (*Asclepias tuberosa*, *A. amplexicaulis*, and *A. purpurascens*), and the wild pink (*Silene pennsylvanica*, Fig. 7*c*), which grows in sandy barrens on Long Island, though it is more frequent on gravelly banks. In this sand area the three-toothed cinquefoil (*Potentilla tridentata*, Fig. 8*a*) thrives; southward it is a plant of sterile mountain tops rather than of the coast, but it will grow in any kind of dry soil.

Directly opposite the pond and sand barren is the *bog*. The term "bog," as usually applied in northeastern United States, refers to a wet place occupied by ericaceous shrubs and sedges, and is essentially treeless. When such an area is wholly invaded by trees, chiefly spruce and cedar, it becomes a swamp. In a bog the water is ordinarily acid; though "marl bogs" in limestone regions are frequently alkaline and may lack the ericaceous plants. This "New Jersey bog" was one of the first developments in the Garden, and was constructed in 1911 as an irregular basin of concrete about fifty feet long and eighteen inches deep, with six-inch walls and floor. This structure was filled with peat and sand brought up in barrels from the pine-barrens, and was one of the most successful elements of the original plantation. When the area was replanned, in 1931, on an ecological rather than a systematic basis, all material in the bog was removed, the surfaces were covered with asphalt, and the entire basin was filled to the brim with baled peat-moss. In the beginning aluminum sulphate was placed in the bog as an acidifier; but this treatment was soon discontinued, and the plants have grown just as well. The peat bog has been the easiest

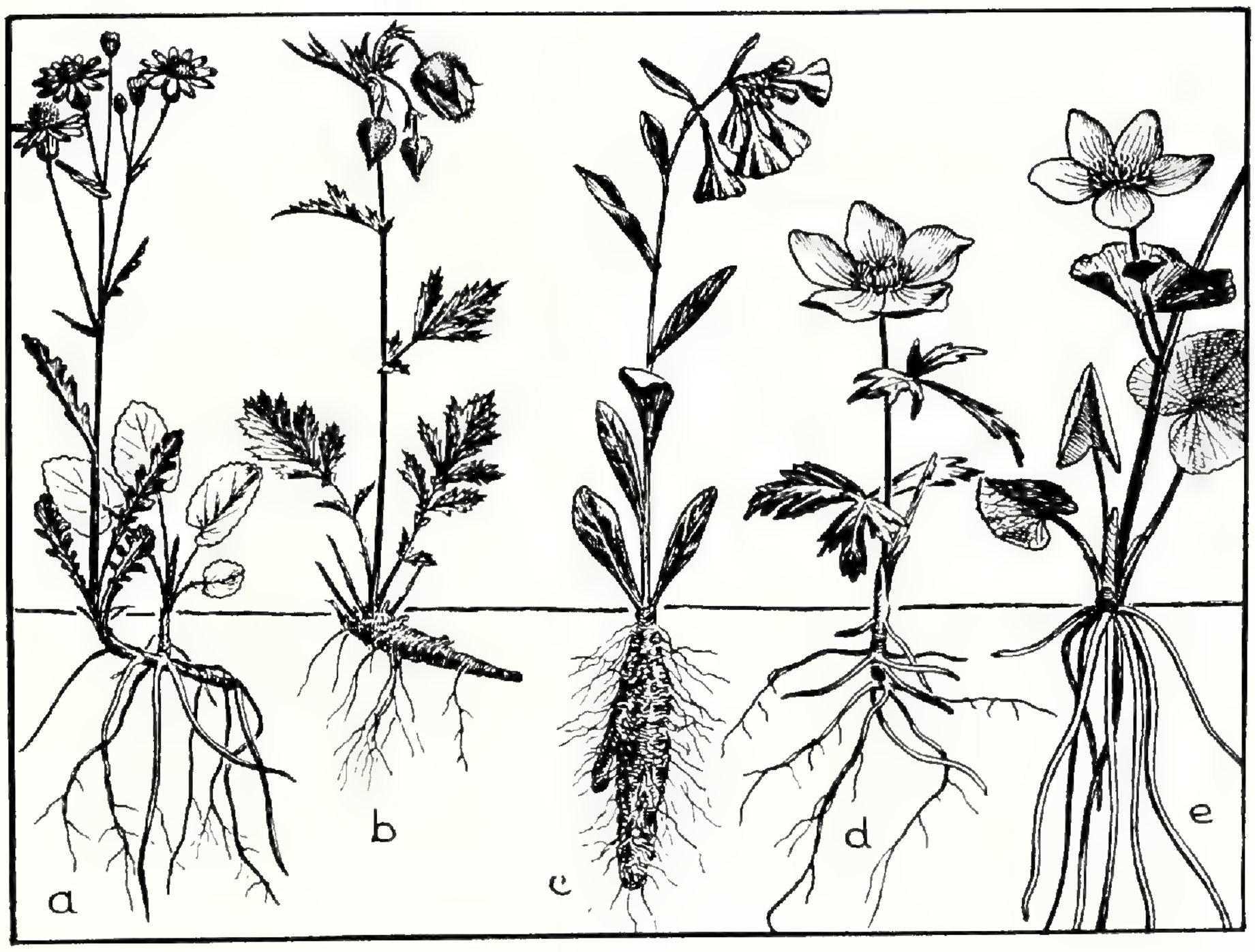


FIG. 10. Meadow plants. *a*, golden ragwort (*Senecio aureus*); *b*, purple avens (*Geum rivale*); *c*, Virginia cowslip (*Mertensia virginica*); *d*, globeflower (*Trollius laxus*); *e*, marsh marigold (*Caltha palustris*).

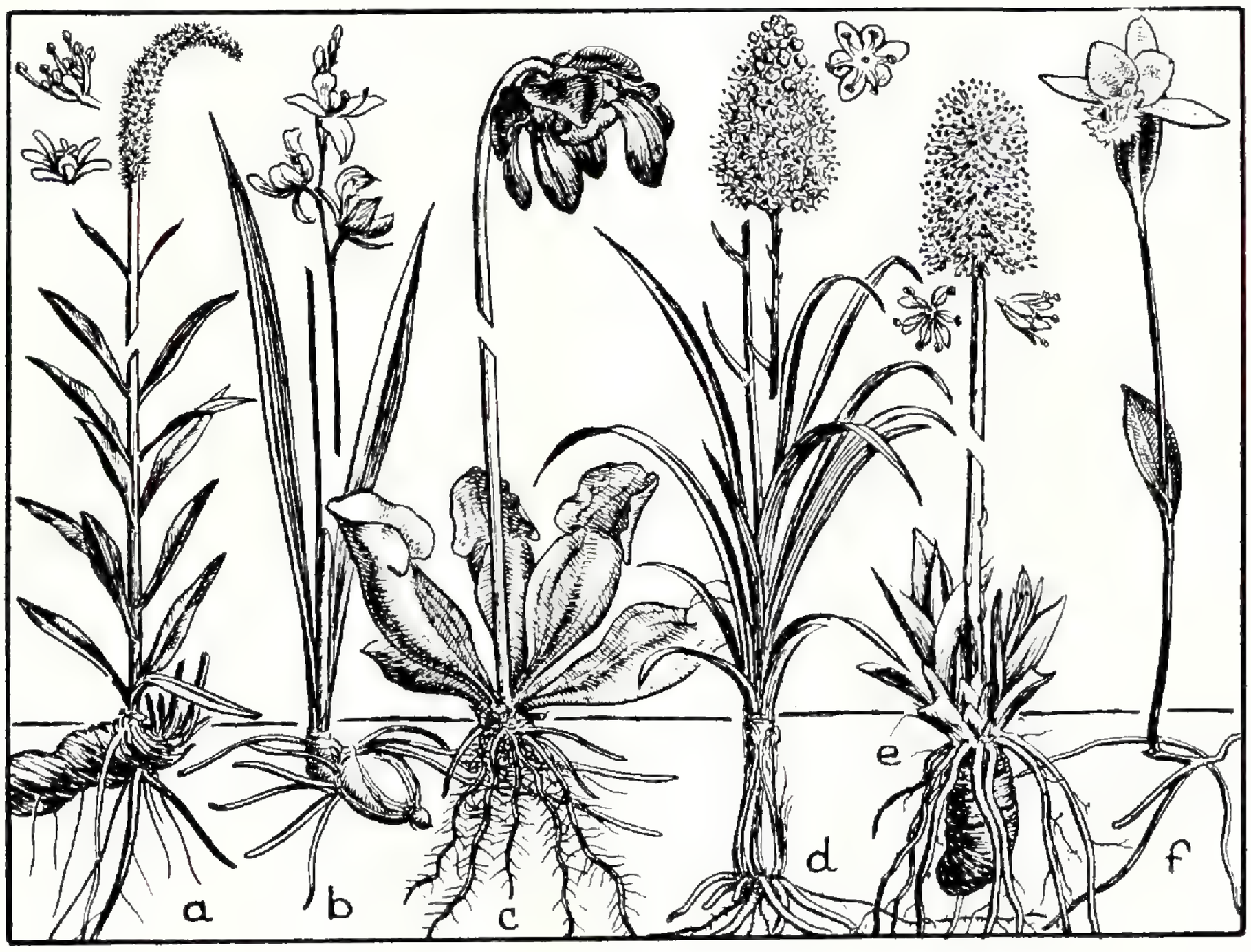


FIG. 11. Bog plants (except *Chamaelirium*). *a*, blazing star (*Chamaelirium luteum*); *b*, *Calopogon pulchellus*; *c*, pitcher-plant (*Sarracenia purpurea*); *d*, fly poison (*Amianthium muscaetoxicum*); *e*, swamp pink (*Helonias bullata*); *f*, *Pogonia ophioglossoides*.

of all plant habitats to maintain. The only difficulty has been the encroachment of cranberry vines (*Vaccinium macrocarpon*) and other hardy species, but this condition can be remedied by removing upper layers of the peat containing the encroaching species, and replanting with less aggressive species. Three European plants appeared in the peat and have persisted: *Calluna vulgaris, Erica cinerea,* and the black heath-grass (*Molinia coerulea*).

Since this bog must function for both northern and southern species, there has been some mixture of these two elements. Around the margins are coniferous trees: red spruce (*Picea rubens*), black spruce (*Picea mariana*), larch (*Larix laricina*), and swamp cedar (*Chamaecyparis thyoides*), with an undergrowth of rhodora (*Rhododendron canadense*). These species actually mingle in some of the northern outposts of the swamp cedar, which extends northward to central New Hampshire. In the bog itself are northern plants such as *Calla palustris, Kalmia polifolia,* and the small cranberry (*Vaccinium Oxycoccus*); some plants essentially of the pine-barrens, *Sabatia lanceolata,* the purple-flowered sundew (*Drosera filiformis*), redroot (*Lachnanthes tinctoria*), *Lophiola aurea, Tofieldia racemosa,* the fox-tail club-moss (*Lycopodium alopecuroides*), and yellow-eyed grass (*Xyris caroliniana*). Many, such as the pitcher plant (*Sarracenia purpurea,* Fig. 11*c*), the orchids *Arethusa, Calopogon pulchellus* (Fig. 11*b*), and *Pogonia ophioglossoides* (Fig. 11*f*), and the common sundews (*Drosera rotundifolia* and *D. longifolia*), are found both in the northern and southern parts of our range.

At the border of the bog in damp sand grow the turkey-beard (*Xerophyllum asphodeloides*), which flowers only in occasional years, the sand myrtle (*Leiophyllum buxifolium*), the sand-barren gentian (*Gentiana Porphyrio*), the red milkweed (*Asclepias rubra*), and the turk's-cap lily (*Lilium superbum*); all these are coastal-plain plants. In peat adjacent to the bog (on the far side) will be found five interesting plants of the *Melanthium* group: fly poison (*Amianthium muscaetoxicum,* Fig. 11*d*), swamp pink (*Helonias bullata,* Fig. 11*e*), *Zygadenus leimanthoides* (Fig. 4, Map 6), the bog asphodel (*Narthecium americana*), which we have not yet succeeded in bringing into flower, and blazing star (*Chamaelirium luteum,* Fig. 11*a*), the last-named usually confined to richer woodlands.

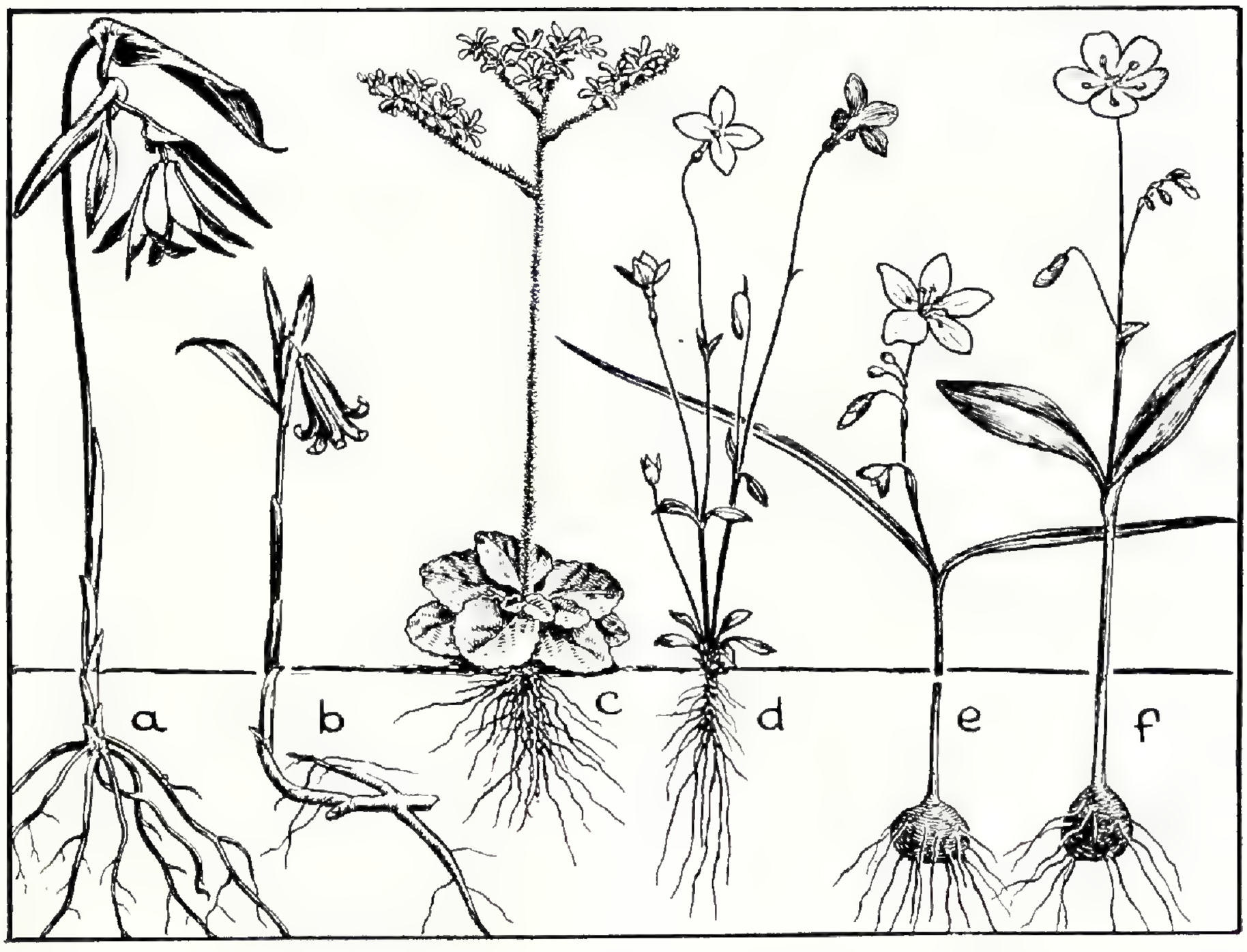


FIG. 12. Woodland plants. *a*, bellwort (*Uvularia grandiflora*); *b*, *Oakesia sessilifolia*; *c*, early saxifrage (*Saxifraga virginiensis*); *d*, bluets (*Houstonia caerulea*); *e*, *Claytonia virginica*; *f*, *Claytonia caroliniana*.

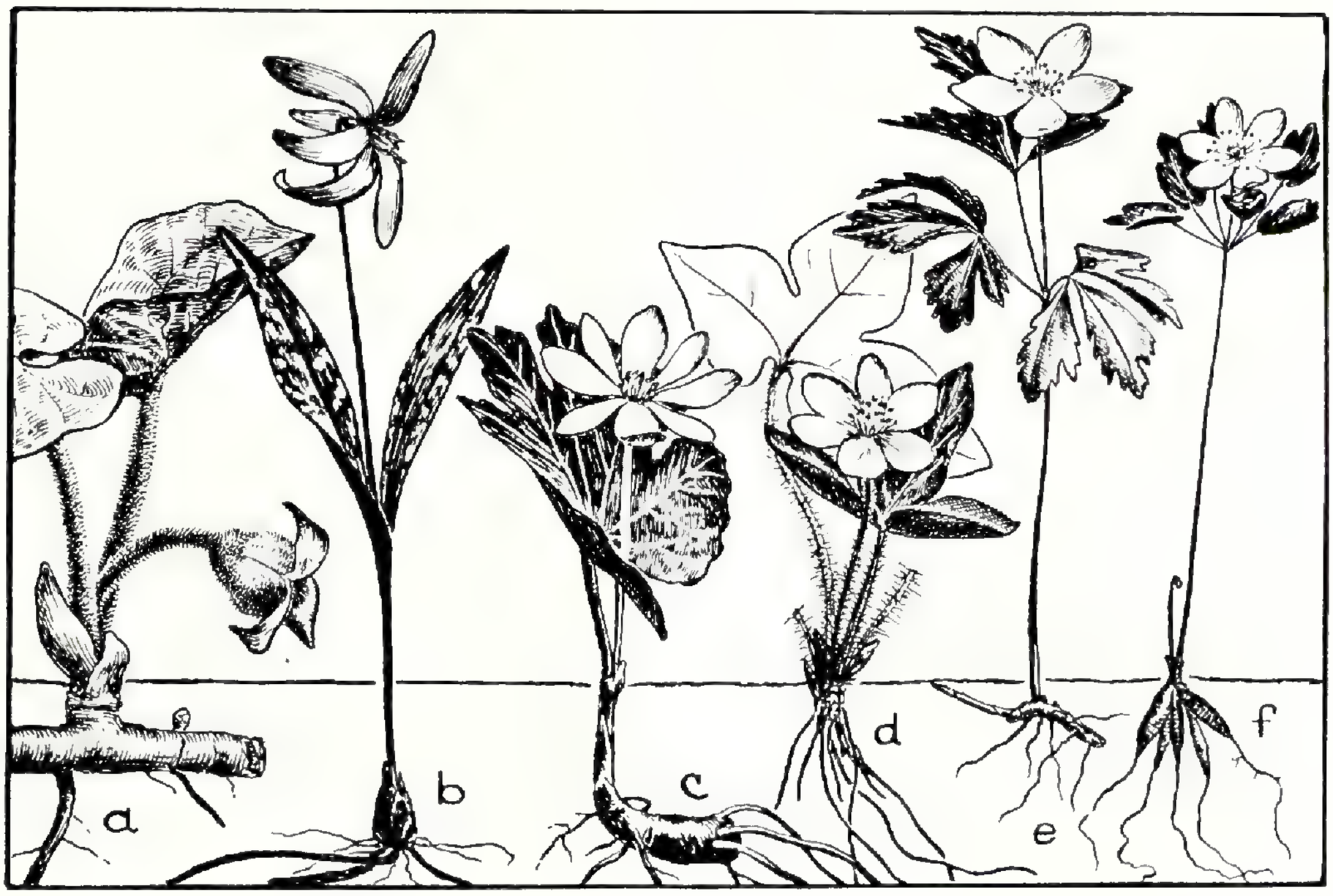


FIG. 13. Woodland plants. *a*, wild ginger (*Asarum canadense*); *b*, dog-tooth violet (*Erythronium americanum*); *c*, *bloodroot* (*Sanguinaria canadensis*); *d*, *Hepatica acutiloba*; *e*, *Anemone quinquefolia*; *f*, rue anemone (*Anemonella thalictroides*).

On the far side of the bog, below the boulders which line the border mound, will be found (for the present) the assemblage of northern woodland plants usually confined in our area to an altitude of a thousand feet or more (Fig. 3A). These are as follows:

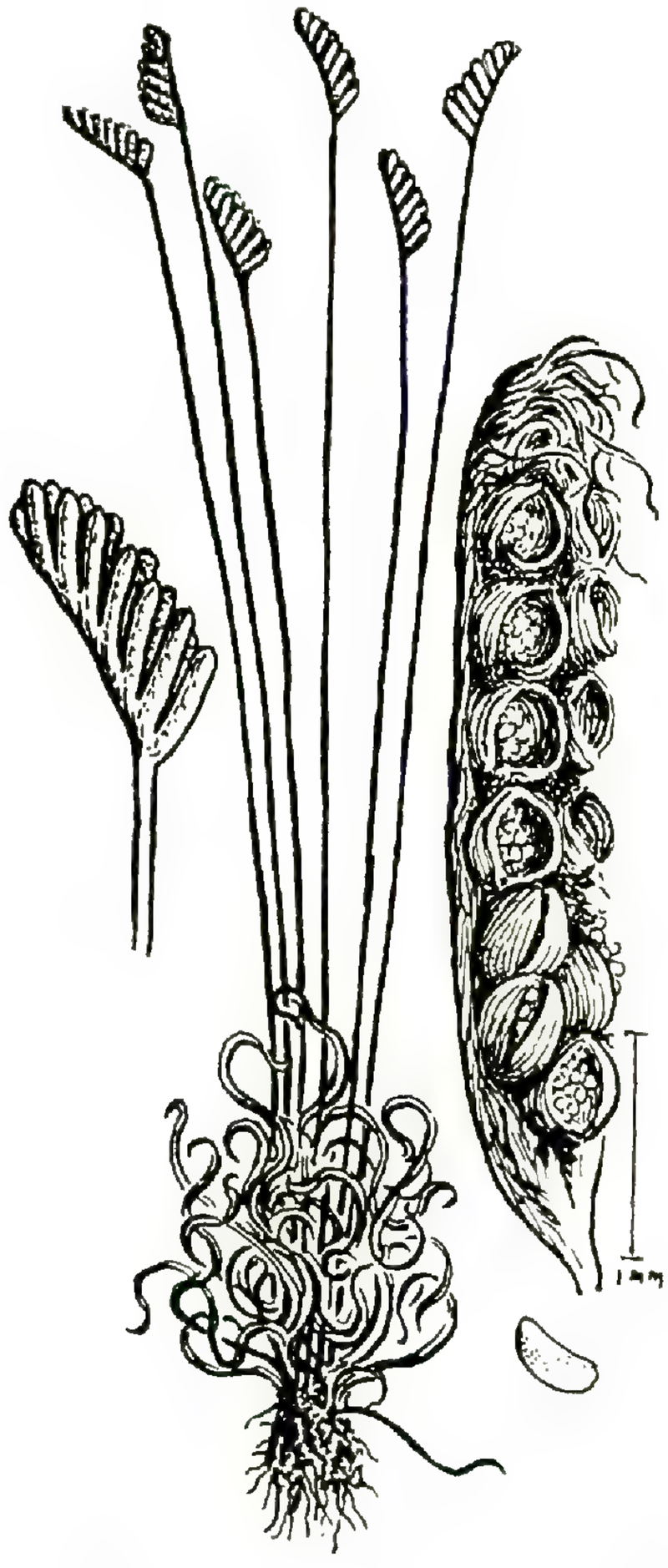


FIG. 14. Curly-grass (*Schizaea pusilla*), showing fertile frond and spore cases enlarged.

balsam fir (*Abies balsamea*), red-berried elder (*Sambucus racemosa*), hobble-bush (*Viburnum alnifolium*), twin-flower (*Linnaea borealis*), bunchberry (*Cornus canadensis*, Fig. 9*c*), creeping snowberry (*Chiogenes hispidula*), twisted-stalk (*Streptopus roseus*, Fig. 9*a*), the long beech fern (*Phegopteris polypodioides*), the oak fern (*Phegopteris Dryopteris*), and *Clintonia borealis*. This *Clintonia*

does not flower with us, but the white-flowered southern species, *C. umbellulata* (Fig. 9*e*), extending northward to New Jersey, flowers profusely.

To the south of the bog will be found the newly-installed limestone ledges, the characteristic flora of which has already been enumerated (p. 187). Additional species to be seen here are the rue anemone (*Anemonella thalictroides*, Fig. 13*f*), *Anemone virginiana*, *Ranunculus hispidus*, early saxifrage (*Saxifraga virginiensis*, Fig. 12*c*), and the maiden-hair fern (*Adiantum pedatum*). On the crest of the rocks are arbor-vitae (*Thuya occidentalis*), slippery elm (*Ulmus fulva*), butternut (*Juglans cinerea*), *Viburnum pubescens*, the bladder nut (*Staphylea trifolia*), and prickly ash (*Zanthoxylum americanum*); these are more or less characteristic of limestone outcrops.

Just beyond the bog will be found a wet meadow into which the brook drains. The earliest plant to flower in this meadow is the globe-flower (*Trollius laxus*, Fig. 10*d*), soon followed by the marsh marigold (*Caltha palustris*, Fig. 10*c*), winter cress (*Barbarea vulgaris*), purple avens (*Geum rivale*, Fig. 10*b*), golden ragwort (*Senecio aureus*, Fig. 10*a*), and *Ranunculus septentrionalis*, and later by a thicket of herbaceous plants such as the beaver poison (*Cicuta maculata*) and *Lilium canadense*, and, as autumn approaches, by a wealth of goldenrods and asters.

Along the brook can be seen skunk cabbage (*Symplocarpus foetidus*), Jack-in-the-pulpit (*Arisaema triphyllum*), Virginia cowslip (*Mertensia virginica*, Fig. 10*c*), various species of ferns, dog-tooth violet (*Erythronium americanum*, Fig. 13*b*), *Claytonia virginica* (Fig. 12*e*), May apple (*Podophyllum*), goldthread (*Coptis trifolia*, Fig. 9*d*), several violets (*Viola affinis, V. blanda, V. pallens, V. primulifolia, V. lanceolata, V. papilionacea, V. cucullata, V. striata*), miterwort (*Mitella diphylla*), false miterwort (*Tiarella cordifolia*), toothwort (*Dentaria diphylla*), *Anemone quinquefolia* (Fig. 13*e*) and *A. canadensis*, water-leaf (*Hydrophyllum virginianum*), and bluets (*Houstonia caerulea*, Fig. 12*d*).

The northern end of the two acres is taken up by a woodland of red and black oaks (*Quercus rubra* and *Q. velutina*), beech (*Fagus grandifolia*), tulip tree, black birch (*Betula lenta*), and sugar maple (*Acer saccharum*), set out in 1918 and representing the Alle-

FIG. 15. Bog, showing *Sarracenia purpurea*, *Eriocaulon decangulare*, and *Helianthus angustifolius*.

FIG. 16. Limestone ledge (newly-constructed). First planting, April, 1942.

ghenian deciduous forest. It serves as a shelter for spring flowers, which in most cases set flower buds underground the previous autumn and pass through the flowering stages in early spring before the leaves come out on the trees. When the forest leaves have expanded, one must look to the open bogs and barrens for a continuation of flower display, until autumn, with the falling of the leaves, sets up a display, this time of asters and golden-rods. Some of the plants of the Alleghenian forest have been mentioned in the enumeration of plants along the brook; additional species to be seen, chiefly on higher ground, are bloodroot (*Sanguinaria canadensis*, Fig. 13*c*), *Hepatica triloba*, *Claytonia caroliniana* (Fig. 12*f*, a broad-leaved species, chiefly of the Canadian zone), wild ginger (*Asarum canadense*, Fig. 13*a*), *Trillium erectum*, *Trillium grandiflorum*, blue cohosh (*Caulophyllum thalictroides*), early meadow-rue (*Thalictrum dioicum*), *Jeffersonia diphylla* (resembling the bloodroot, and known as far north as Bucks County, Pennsylvania), *Heuchera americana*, *Dicentra eximia* (known northward to the region of the Delaware Water Gap), wild lily-of-the-valley (*Maianthemum canadense*), the yellow violets (*Viola pubescens* and *V. scabriuscula*), and the bellworts (*Uvularia perfoliata*, *U. grandiflora*, Fig. 12*a*, and *Oakesia sessilifolia*, Fig. 12*b*). The knoll at the far end of the woodland has banks exposed to the south, and here will be found the earliest blooms of hepatica, bloodroot, and Claytonia; the ledge of granitic rock just beyond has been given over almost entirely to the growth of columbine (*Aquilegia canadensis*).

Many plants not mentioned in the foregoing paragraphs will be found in various places. Among them are species of *Cypripedium*, robin's plantain (*Erigeron pulchellus*), golden alexanders (*Zizia aurea*, Fig. 9*b*), wild geranium (*Geranium maculatum*), Canadian burnet (*Sanguisorba canadensis*), and the two native species of Iris (*I. sempervirens* and *I. prismatica*). Only the spring-blooming plants have been included in this account; those of the summer and fall may perhaps be treated in a later publication.

Notes on the Time of Flowering and on Cultural Requirements

For several years records have been kept of the earliest dates and the periods of flowering of various species. In the excep-

FIG. 17. Serpentine bank, showing *Euphorbia Darlingtonii* and *Cerastium arvense*. *Kalmia latifolia* in the background.

tionally early spring of 1936, the hepatica appeared on March 24; even in late seasons, as in 1934 and 1937, it comes into flower during the first week in April. *Claytonia*, *Trollius laxus*, bloodroot, *Corema*, and *Caltha* follow within the succeeding week. The third week in April ordinarily brings in *Saxifraga virginiensis*, *Chamaedaphne*, *Mertensia*, *Epigaea*, *Ranunculus hispidus*, *Anemonella*, and *Trillium grandiflorum*. By the first of May the following additional species are in bloom: rhodora, *Helonias bullata*, *Coptis*, *Kalmia polifolia*, *Erythronium*, *Arctostaphylos*, *Leiophyllum*, *Viola fimbriatula* and *V. pedata*, and *Trillium erectum*. The middle of May usually sees the Local Flora at its best with the added flowering of most of the woodland plants and the early species of the sand-barren and serpentine areas (Fig. 3).

The accompanying drawings by Miss Maud H. Purdy, of the Brooklyn Botanic Garden Staff, were made from plants flowering in April or May of this year in the Local Flora Section, with the exception of the two orchids (Figs. 11*b* and 11*f*), which were in bud on June 1. The underground portions have been carefully delineated in order to show the problems involved in transplanting. With the exception of the cardinal flower, violets, the native columbine, *Dicentra eximia*, *Arenaria caroliniana*, and most asters and goldenrods, the native plants do not reproduce readily from seeds in the Brooklyn Botanic Garden. This may be due partly to the faulty atmospheric conditions to be found in the center of a large city, but the writer suspects that even under the best conditions dependence must be made on collected plants or nursery-grown stock rather than upon a general attempt to grow wild plants from seeds. It is also believed that the texture and drainage of the soil is far more important than its acid or alkaline content, although the chemical nature may play a larger part where soil and plants have had centuries to reach an equilibrium. But plants of the heath family invariably require a non-calcareous soil, though they are not infrequently found growing wild on the leached soil overlying limestone rocks.

The following species have not as yet been grown successfully in the Local Flora Section:

Woodland species of *Lycopodium*, with the exception of the shiny club-moss, *L. lucidulum*. The other woodland species pro-

FIG. 18. Granitic ledge with columbine (*Aquilegia canadensis*).

duce elongate runners which root and continue growth if soil conditions are favorable, the older portions of the plant gradually dying off. Probably mycorrhiza plays an important part.

Schizaea pusilla (Figs. 4 and 14). The curly-grass fern lives for two or three seasons, and then dies off. In the pine barrens it grows on old cedar stumps just above the surface of the water, or on the moist edges of cranberry bogs. It apparently needs sunlight, constant humidity, and freedom from the competition of other species.

Habenaria psycodes and other orchids of this genus. These persist and flower for one or two years only. Perhaps the soils are not yet mature nor the atmospheric conditions conducive to their growth. Except for the yellow lady's slipper and the bog orchids previously mentioned, it is probably unwise to attempt the growth of native orchids unless one has a fairly exact duplicate of natural conditions. Even the pink *Cypripedium acaule,* which is locally so abundant on Long Island, tends to bloom less and less each year in our plantings, though we have clumps that have been flowering for six years.

Pyxidanthera barbulata. Clumps of the "pyxie moss" have not succeeded for more than two years, after which the plant dies out, though our climate is not much more severe than that of South Amboy, New Jersey, where the plant grows wild.

Polygala paucifolia. The fringed polygala is so abundant in varied types of soil that one would expect it to grow easily. Neither this species nor *Polygala polygama* nor *P. lutea* persists with us for more than a single season.

Castilleja coccinea. The scarlet painted cup is occasional in meadows in northern New Jersey, but like many other members of the Scrophulariaceae it is probably partially parasitic on the roots of other plants.

Trillium cernuum. The nodding trillium, though growing in our region in rich humus below ledges and sometimes in damp soil at the edges of swamps, has not been at all successful; other species of *Trillium* of our region grow readily.

Oxalis violacea. The violet wood-sorrel grows in open woodland on the terminal glacial moraine, and in humus on dry shale

ledges. Neither this species nor the pink wood-sorrel (*O. montana*) of northern woods has as yet succeeded.

Nomenclature and References

The names used in this Guide are those of the seventh edition of Gray's Manual; for additional information on the vegetation of the New York region the following works should be consulted:

Britton & Brown, *Illustrated Flora of the Northern United States and Canada.* 1913.

Gleason, H. A., *Plants of the Vicinity of New York.* 1935.

Mathews, Schuyler, *Field Book of American Wild Flowers.* 1927.

Taylor, Norman, *Flora of the Vicinity of New York.* Memoirs of the New York Botanical Garden, Vol. V. 1915.

Bulletin of the Torrey Botanical Club (earlier volumes), and *Torreya* (seriatim).

Rhodora, Bulletin of the New England Botanical Club (seriatim).

Note: The author's special thanks are due to Miss Hester M. Rusk for assistance in preparation of manuscript, and data supplied.

The Brooklyn Institute of Arts and Sciences

Officers of the Institute

Chairman, Board of Trustees
EDWARD C. BLUM

President
ADRIAN VAN SINDEREN

First Vice-President
WALTER H. CRITTENDEN

Second Vice-President
CHARLES PRATT

Third Vice-President
SIDNEY W. DAVIDSON

Treasurer
EDWIN P. MAYNARD

Secretary
FRANCIS T. CHRISTY

Botanic Garden Governing Committee

MISS HILDA LOINES, *Chairman*

PHILIP A. BENSON, *Vice-Chmn.*
EDWARD C. BLUM, *Ex officio*
WILLIAM G. CREAMER
WALTER H. CRITTENDEN
LEWIS L. FAWCETT
MRS. LEWIS W. FRANCIS
WALTER HAMMITT
WILLIAM T. HUNTER
JAMES G. McDONALD
EDWIN P. MAYNARD
ROBERT MOSES, *Ex officio*
ALFRED E. MUDGE
ADRIAN VAN SINDEREN, *Ex officio*

Ex Officio Members of the Board

The Following Officials of the City of New York

THE MAYOR
THE COMPTROLLER
THE COMMISSIONER OF PARKS

GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Main 2–4433.

The Botanic Garden is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

To Assist Members and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or McDonald-Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. By Automobile from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Papers:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk. By Norman Taylor. 1923. 108 pages. $1.00.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 94. Inheritance of smut resistance in some oat hybrids. By George M. Reed. 7 pages. 1941.

No. 95. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1940. By Arthur Harmount Graves. 8 pages. 1941.

No. 96. Inheritance of smut resistance in hybrids of Navarro oats. By George M. Reed. 7 pages. 1942.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 9. The Rose Garden of the Brooklyn Botanic Garden. 12 illustrations, folded map. By Montague Free. Price, 50 cents.

Guide No. 10. Gardens within a garden: A general guide to the grounds of the Brooklyn Botanic Garden. Second Edition. 57 pages; 21 illustrations. Folded map. By C. Stuart Gager. Price, 25 cents; by mail, 30 cents.

Guide No. 11. List of shrubs, exclusive of conifers, growing outdoors in the Brooklyn Botanic Garden. 32 pages; 5 illustrations. By Charles F. Doney. Price, 25 cents; by mail, 30 cents.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail 30 cents.

Guide No. 13. Trees in the Brooklyn Botanic Garden. 53 pages; 9 illustrations. By Alfred Gundersen and Arthur H. Graves. Price, 25 cents; by mail, 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI OCTOBER 1942 No. 4

PROSPECTUS

1942 - 1943

INCLUDING VICTORY GARDEN COURSES

PUBLISHED QUARTERLY

BROOKLYN BOTANIC GARDEN

Scientific, Educational, and Administrative Officers

SCIENTIFIC AND EDUCATIONAL

The Staff

C. STUART GAGER, Ph.D., Sc.D., Pd.D., *Director*
MONTAGUE FREE, Certificate, Royal Botanic Gardens, Kew, *Horticulturist*
ARTHUR HARMOUNT GRAVES, Ph.D., *Curator of Public Instruction*
ALFRED GUNDERSEN, Docteur de l'Université (Paris), *Curator of Plants*
WILLIAM E. JORDAN, B.S., *Librarian*
GEORGE M. REED, Ph.D., *Curator of Plant Pathology*
ELLEN EDDY SHAW, M.A., *Curator of Elementary Instruction*
HENRY K. SVENSON, Ph.D., *Curator of the Herbarium*
MARGARET M. DORWARD, A.B., *Assistant Curator of Elementary Instruction*

Other Officers

MARY AVERILL, *Honorary Curator of Oriental Gardening and Floral Art*
HAROLD A. CAPARN, *Consulting Landscape Architect*
ELIZABETH REMSEN VAN BRUNT, *Honorary Curator of Culinary Herbs*

RALPH CURTISS BENEDICT, Ph.D., *Resident Investigator (Ferns)*
RALPH H. CHENEY, Sc.D., *Resident Investigator (Economic Plants)*

G. ELIZABETH ASHWELL, A.B., *Curatorial Assistant*
MICHALENA LEFRERE CARROLL, *Instructor*
EMILIE PERPALL CHICHESTER, *Library Assistant*
ELIZABETH CLARKE, A.B., *Curatorial Assistant*
CHARLES F. DONEY, M.S., *Assistant in Woody Plants*
WILLIAM H. DURKIN, *Curatorial Assistant*
ELSIE TWEMLOW HAMMOND, M.A., *Instructor*
FRANCES M. MINER, M.A., *Instructor*
HESTER M. RUSK, A.M., *Instructor*
MARGERY H. UDELL, *Curatorial Assistant*
L. GORDON UTTER, M.S., Ph.D., *Research Assistant*
JEANNE PHYLLIS WALTHER, A.M., *Research Assistant*

LOUIS BUHLE, *Photographer*
MAUD H. PURDY, *Artist*

ADMINISTRATIVE

THOMAS A. DONNELLY, *Secretary and Accountant* [1]
EDNA PALMITIER SCHACHT, *Acting Secretary* [2]
JANE E. COFFIN, *Office Assistant*

MARIE-LOUISE HUBBARD, A.M., *Secretary to the Director*
FRANK STOLL, *Registrar and Custodian*

LAURA M. BREWSTER, *Stenographer*
VIRGINIA A. CLAY, *Stenographer*
CONSTANCE PURVES ELSON, B.A., *Stenographer*
LORRAINE LAROCHE, *Stenographer*
BETTY G. RILEY, *Stenographer*

Published Quarterly at Prince and Lemon Streets, Lancaster, Pa.
by the Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y.
Entered as second-class matter in the post-office at Lancaster, Pa., under act of August 24, 1912

[1] Absent on U. S. Government duty, from April 1, 1942.
[2] Beginning April 1, 1942.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

FOUNDED, 1824. REINCORPORATED, 1890

ADRIAN VAN SINDEREN, *Prcsident.* EDWARD C. BLUM, *Chairman of the Board.*

THE DEPARTMENT OF EDUCATION

BROOKLYN ACADEMY OF MUSIC—30 LAFAYETTE AVENUE—STerling 3–6700

BROOKLYN BOTANIC GARDEN

1000 WASHINGTON AVENUE—MAin 2–4433

THE BROOKLYN MUSEUM

CENTRAL MUSEUM—EASTERN PARKWAY—NEvins 8–5000
CHILDREN'S MUSEUM—BROOKLYN AVENUE AND PARK PLACE —PRospect 3–7117

MEMBERSHIP

You are cordially invited to become a member of one or all of the Departments of the Brooklyn Institute. The annual fee in each Department is $10, carrying full privileges in the division of your choice and partial privileges in the other two. Membership runs for twelve months from the time it is taken out.

THE DEPARTMENT OF EDUCATION offers its members free admission to more than 250 events: lectures, concerts, motion pictures, young people's programs, field trips, etc. Also: reduced rates for special courses and programs.

ADRIAN VAN SINDEREN, *Chairman, Governing Committee.* JULIUS BLOOM, *Director.*

THE BOTANIC GARDEN offers its members free admission to "Flower Days," Spring Inspection, field trips, and most classes of instruction. Also: docent services, privileges of library and herbarium, free publications, advice on all aspects of gardening, distribution of surplus plant material, and visiting membership privileges in the botanic gardens and museums of other cities.

MISS HILDA LOINES, *Chairman, Governing Committee.* DR. C. STUART GAGER, *Director.*

THE MUSEUM offers its members private views of exhibitions, admission to Museum courses, phonograph records and prints from its lending libraries, and docent services. Also: five Museum publications free of charge and other Museum publications at reduced prices.

WALTER H. CRITTENDEN, *Chairman, Governing Committee.* LAURANCE P. ROBERTS, *Director.*

THE BROOKLYN ACADEMY OF MUSIC is owned and operated by the Brooklyn Institute. Its Opera House, Music Hall, and Ballroom may be rented for concerts, plays, lectures, school ceremonies, dances, and other events.

WILLIAM T. HUNTER, *Chairman, Building Committee.* HERBERT T. SWIN, *Building Superintendent.*

PRIVILEGES OF MEMBERSHIP IN THE BROOKLYN BOTANIC GARDEN

The Brooklyn Botanic Garden renders a public service in its endeavor to advance a knowledge of plants, affording educational advantages, and carrying on fundamental investigations. Members of the Garden have the opportunity of furthering these aims.

Special membership privileges are also offered as follows:

1. Advice on the choice and care of ornamental trees, shrubs, and herbaceous plants, and the best ways to grow plants successfully, involving methods of culture, and control of insect and fungous pests.
2. The naming of botanical specimens submitted for determination.
3. Periodical distribution of surplus ornamental plant material and seeds.
4. Invitations for self and friends to the Annual Spring Inspection, and to spring and fall "Flower Days"; cards of admission to all exhibitions and openings preceding the admission of the general public, and to receptions; admission of member and one guest to field trips and other scientific meetings under Garden auspices, at the Garden or elsewhere.
5. Services of a guide (by appointment) for self and party, when visiting the Garden.
6. Free tuition in all courses of instruction, except that in laboratory courses a small fee is charged to cover cost of materials, etc.
7. The Library and Herbarium are available for consultation.
8. Announcement cards concerning plants in bloom and the activities of the Garden are sent to members from time to time.
9. As part of its services, the Brooklyn Botanic Garden issues publications of general horticultural interest, and technical papers based upon the researches carried out at the Garden. Special *Guides* to plantations and collections, *Leaflets* of popular information, and the quarterly *Record,* which includes the *Annual Report* of the Garden's activities, are sent free to members.
10. Membership privileges in other botanic gardens and museums outside of Greater New York are offered to our members when they are visiting other cities and on presentation of Brooklyn Botanic Garden membership card.

CLUB MEMBERSHIPS

For many years the Botanic Garden has had the pleasure of co-operating in numerous ways with Garden Clubs, Women's Clubs, and other organizations of the Metropolitan area, and a plan has been adopted whereby such organizations may become definitely identified with the work of the Garden in promoting an interest in plant life and horticulture, as follows:

Annual Memberships.—Garden Clubs or other organizations may qualify as Annual Members of the Garden on election by the Board of Trustees and payment of the annual membership fee of Ten Dollars. Each annual member club may designate one of its officers or other member to receive such invitations, notices, and publications as go to individual annual members and to represent the club at all Botanic Garden functions, including "Flower Days" and the annual Spring Inspection in May.

The Club may also have the following privileges:

a. *The services of a Botanic Garden docent or guide* for a tour of the plantations or conservatories, followed by tea. No parties of less than six adults will be conducted. Schedule for such events must be arranged for in advance, at dates mutually convenient to the Botanic Garden and the Club.

b. *One extra-mural lecture a year* by a member of the Garden staff. The Garden supplies, on request, a list of staff members available for outside lectures.

Arrangements will be facilitated if the Club will, with each request, designate at least two names.

c. One member of the club is entitled annually to free tuition in courses of instruction for which tuition is charged to non-members. In Laboratory Courses a nominal fee is charged to cover cost of material.

Sustaining Memberships.—Any club or other organization may become a Sustaining Member of the Garden on election by the Board of Trustees and annual payment to the Garden of the sustaining membership fee of Twenty-five Dollars.

Sustaining membership clubs enjoy the full privileges of annual membership, not only in the Botanic Garden but also in the Brooklyn Museum and The Institute at the Academy of Music. They may designate three members who may receive free tuition in Botanic Garden courses of instruction for which tuition is charged to non-members. They are entitled each year to two extra-mural lectures free, by a lecturer chosen from the Garden's list of lecturers.

OUT-OF-TOWN MEMBERSHIP PRIVILEGES

In accordance with a cooperative arrangement with a number of other institutions and organizations, Brooklyn Botanic Garden members, when visiting other cities, may, on presentation of their Botanic Garden membership card at the office of the cooperating museum or organization, be accorded, without charge, the same privileges as are enjoyed by the members of that institution, including admission to exhibits and lectures, and invitation to social events. This does not include being enrolled on the mailing list for publications, and does not include free admission to the Philadelphia and Boston spring Flower Shows.

In reciprocation, the members of the cooperating units, when visiting the Metropolitan district of Greater New York, will be accorded full membership privileges at the Brooklyn Botanic Garden.

The cooperating units are as follows:

Academy of Natural Sciences, Philadelphia, Pa.
Berkshire Museum, Springfield, Mass.
Boston Society of Natural History, Boston, Mass.
Buffalo Museum of Science, Buffalo, N. Y.
California Academy of Sciences, San Francisco, Calif.
Carnegie Museum, Pittsburgh, Pa.
Charleston Museum, Charleston, S. C.
Cranbrook Institute of Science, Bloomfield Hills, Mich.
Everhart Museum of Natural History, Science and Art, Scranton, Pa.
Fairbanks Museum of Natural Science, St. Johnsbury, Vt.
Field Museum of Natural History, Chicago, Ill.
Los Angeles Museum, Los Angeles, Calif.
Massachusetts Horticultural Society, Boston, Mass.
Missouri Botanical Garden, St. Louis, Mo.
Newark Museum, Newark, N. J.
New York State Museum, Albany, N. Y.
Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.
Pennsylvania Horticultural Society, Philadelphia, Pa.
Philadelphia Commercial Museum, Philadelphia, Pa.
Southwest Museum, Los Angeles, Calif.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in three main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden.

Any of the following eight classes of membership may be taken out through the Botanic Garden:

1.	Annual, by annual payment of	$ 10
2.	Sustaining, by annual payment of	25
3.	Contributing, by annual payment of ..	100
4.	Life, by one payment of	500
5.	Permanent, by one payment of	2,500
6.	Donor, by one payment of	10,000
7.	Patron, by one payment of	25,000
8.	Benefactor, by one payment of	100,000

Sustaining members are annual members with full privileges in Departments one to three. Membership in classes two to eight carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members also enjoy the special privileges indicated on a preceding page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, Main 2-4433.

NOTE: *Contributions to the Brooklyn Botanic Garden, through membership dues or otherwise, constitute proper deductions under the Federal and New York State Income Tax Laws.*

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden *

.....

.....

* The following additional purposes are suggested for which endowment is needed:

1. Botanical research.
2. Publishing the results of botanical investigations.
3. Popular botanical publication.
4. The endowment of a lectureship, or a lecture course.
5. Botanical illustrations for publications and lectures.
6. The purchase and collecting of plants.
7. The beautifying of the grounds.
8. The purchase of publications for the library.
9. Extending and enriching our work of public education.
10. The establishing of prizes to be awarded by the Brooklyn Botanic Garden for botanical research, or for superior excellence of botanical work in the High Schools of the City of New York.

REGULATIONS CONCERNING PHOTOGRAPHING, PAINTING, AND SKETCHING

1. No permit is required for photographing with a hand camera, or for sketching or painting without an easel on the Grounds or in the Conservatories.

2. Sketching and painting with an easel and the use of a camera with tripod are not allowed in the Oriental Garden, the Rose Garden, the Local Flora Section (Native Wild Flower Garden), nor the Conservatories at any time without a permit. No permits are given for use after 12 o'clock noon on Sundays and holidays.

3. Artists, and the public in general, may not bring into the Botanic Garden chairs, stools, or anything to sit in or on.

4. Holders of permits must not set up tripod cameras nor easels in such a way as to involve injury to living plants or lawns, nor to cause an obstruction to traffic on congested paths or walks.

5. Application for permits should be made at the office of the Director, Laboratory Building, Room 301, or by mail (1000 Washington Avenue), or by telephone (MAin 2–4433).

THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for other items of maintenance. One third of the cost of the present buildings (total cost, about $300,000), and other permanent improvements to a total of more than $281,000, has been met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which, in turn, is reimbursed from time to time by the City, within the limits, and according to the terms of the annual Tax Budget appropriation. Certain salaries are paid, in whole or in part, from private funds.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the Garden, from its beginning, to purchase with private funds all publications for the library, all specimens for the herbarium, all lantern slides and photographic material, and numerous other items. These collections, available without charge for public use, are the property of the Trustees.

The interest on One Million Dollars at the rate of 3.5 per cent, added to the present private funds income, would restore that income to the 1930 figure. The director will be glad to give full information as to the uses for which such additional income is needed.

FIG. 1. The beauty and educational value of the plantations draw large numbers of visitors—more than 1,753,000 in 1941. Double queues at two gates are at times maintained for three hours or more. (9323)

BROOKLYN BOTANIC GARDEN RECORD

VOL. XXXI OCTOBER, 1942 NO. 4

PROSPECTUS: 1942–1943

Special features have been introduced into this Prospectus to help meet the practical and spiritual needs of the hour—for the war that has been thrust upon us has created both.

"Food is a whole arsenal of weapons in this struggle for human freedom. It is the driving force behind high production by munitions workers, and top-notch performance and high morale among soldiers and sailors" (*The Secretary of Agriculture, Claude R. Wickard*).

The necessity of increasing the food supply must be met chiefly by large-scale gardening on plots of acreage dimensions, but everyone who has even a small garden plot, or a backyard that can be converted into one, can do his bit, provided he has some knowledge of how to go about it. Without knowing how to garden, it is very easy to waste, not only effort, but seeds and fertilizer, and the nation has none to waste.

Residents of a large city, as a rule, lack the knowledge and experience of gardening which is common in the village, and special "V" courses to meet this need have been organized and are offered in the following pages, as well as "peace-time" courses, including classes in ornamental horticulture.

The second *"Victory Garden Leaflet,"* given out by the U. S. Department of Agriculture and cooperating agencies, and distributed by the Brooklyn Botanic Garden to all the Garden's members and friends, urges people to include "a few flowers in the vegetable garden if you have no separate flower garden,—along the edge, or a row of flowering annuals among the vegetables."

Courses V4, V6, V8, and V9, and some of the A courses, are planned to be helpful to those who wish to do this.

COURSES OF INSTRUCTION

Courses for adults and children are classified in the following pages as follows:

For members and the general public:
Victory garden courses ("V" courses, p. 215)
Regular courses ("A" courses, p. 219)
For teachers ("B" courses, p. 226)
For children ("C" courses, p. 229)
For special groups ("D" courses, p. 230)
Investigation ("E" courses, p. 231)

Any course may be withdrawn when less than ten persons apply for registration, and no course will be given for less than six persons.

Registration.—Because of the limited space available in the instructional greenhouses, and for other reasons, the number of persons that can be registered in many of the courses must be limited. Those who desire to attend any course are urged to send in their applications, with entrance fees, to the Secretary, Brooklyn Botanic Garden, several days in advance of the first meeting. This avoids delay at the beginning of the first session, ensures a place in the course, and enables the instructor to provide adequate material for the class.

Persons are requested not to register in any course unless they are reasonably confident that they can attend the sessions regularly and throughout. This is especially important where the number is limited; for it is obvious that those who register and do not attend may deprive someone else of the privilege of attending.

V and A Courses.—Although these courses are designed primarily for Members of the Botanic Garden, they are open (unless otherwise specified) to any one who has a general interest in plants. Teachers are welcome. Starred courses (*) are open also for credit to students of Long Island University, and are described in the current Long Island University catalog. In harmony with an agreement entered into in the spring of 1935, the Botanic Garden, upon recommendation of the Chairman of the Biology Department of Long Island University, offers a course scholarship to one student of the University. A similar arrangement has been made with Brooklyn College. (Cf. p. 219, foot-note.)

INDEXED LIST OF COURSES

	Date of First Meeting	Page
Adults' Courses		
Books on Gardening, fall, morning	Dec. 3	217
Drawing, Botanical, winter, morning	Dec. 4	222
Ferns, Native		
Fall, evening	Sept. 14	221
Spring, evening	May 12	225
Flowers, Cultivated		
See Herbaceous Plants, and Lilacs		
Flowers, Wild		
Fall, Saturday afternoon	Sept. 19	221
Fall, morning	Sept. 18	221
Spring, Saturday afternoon	April 24	223
Spring, morning	April 23	225
Spring, evening	April 26	225
Full year, afternoon	Sept. 24	229
Gardening		
Books on Gardening, fall, morning	Dec. 3	217
Fall Garden and Greenhouse Work, morning	Oct. 6	215
Flower Garden, spring, morning	Feb. 24	218
Garden Practice, full year, afternoon, teachers only	Sept. 29	227
Gardening for Beauty, winter, morning	Feb. 3	218
Gardening for Food and Vitamins, spring, morning	March 4	219
Gardening: for Park Department Employees, fall, afternoon	Sept. 23	231
Gardening for Victory: Advanced Course, spring, morning	March 15	219
Gardening for Victory: Beginners' Course, spring, morning	March 5	219
Gardening, Fundamentals of, spring, morning	Feb. 24	218
Herbs, Culinary, fall, morning	Nov. 2	217
Horticulture, Elements of, teachers only, full year, afternoon	Sept. 30	227
Information Please		
Fall, morning	Sept. 28	215
Winter, morning	Feb. 2	218
Spring Garden Work, morning	March 2	218
Your Garden This Fall, morning	Oct. 5	215
Gardens within a Garden		
Fall, afternoon	Sept. 29	222
Spring, afternoon	April 13	226

	Date of First Meeting		Page
Adults' Courses (continued)			
Greenhouse Courses			
Fall Garden and Greenhouse work, morning	Oct.	6	215
Flower Garden, spring, morning	Feb.	24	218
Gardening for Food and Vitamins, spring, morning	March	4	219
Gardening for Victory, spring, morning	March	5, 15	219
Gardening, Fundamentals of, spring, morning	Feb.	24	218
Gardening Indoors, fall, morning	Nov.	4	217
Greenhouse Work, teachers only, full year, afternoon	Oct.	6	227
Horticulture, Elements of, teachers only, full year, afternoon	Sept.	30	227
Plant Culture, teachers only, full year, afternoon	Oct.	22	229
Spring Garden Work, morning	March	2	218
Herbaceous Plants			
Fall, morning	Sept.	16	222
Winter, morning	Jan.	13	223
Spring, afternoon	April	14	225
Herbs, Culinary, fall morning	Nov.	2	217
House Plants			
Gardening Indoors, fall, morning	Nov.	4	217
Greenhouse Work, teachers only, full year, afternoon	Oct.	6, 22	227, 229
Investigation			
Research in Mycology and Plant Pathology			233
Research in Forest Pathology			233
Research in the Systematic Botany of the Flowering Plants			233
Research in the Structure of Flowers			233
Lilacs in Flower, spring, morning	May	4	225
Medicinal Plants for Nurses in training			
Fall, morning, afternoon			230
Spring, morning, afternoon			230
Shrubs, Ornamental			
Fall, afternoon	Sept.	16	222
Winter, afternoon	Jan.	13	223
Spring, morning	April	7	225
Teachers' Courses			
Nature Room, fall, afternoon	Oct.	8	227
Trees and Shrubs, full year, Saturday afternoon	Oct.	3	229
Garden Practice, full year, afternoon	Sept.	29	227
Greenhouse Work, full year, afternoon	Oct.	6	227
Horticulture, Elements of, full year, afternoon	Sept.	30	227
Plant culture, full year, afternoon	Oct.	22	229

	Date of First Meeting		Page
Adults' Courses (continued)			
Wild Flowers and Ferns: Laboratory Study, full year, afternoon	Sept.	24	229
Trees, spring, afternoon	April	12	223
Trees, Shade, fall, afternoon	Sept.	28	221
Trees and Shrubs			
Fall, or full-year, Saturday afternoon	Oct.	3	219, 229
Spring, or full year, Saturday afternoon	April	10	223, 229
Fall, Thursday afternoon	Oct.	8	231
Spring, Thursday afternoon	April	15	230
Tropical American Plants, winter, afternoon	Jan.	13	223
Useful Plants, winter, morning	Feb.	8	218
Children's Courses			
Fall, indoors	Oct.	17	229
Winter, indoors	Jan.	16	230
Spring, indoors	Feb.	27	230
Outdoor garden	April	24	230

V. Victory Garden Courses

For Members and the General Public

Fall

"Information Please."—*One session, Monday, September 28, 10:30 a.m.* An opportunity for those who have had gardens in the season just past to talk over some of their problems. A consultation period planned especially for those who have taken Victory Garden courses, but open to all who are interested in gardening. *No fee.* Mr. Free.

V1. Your Garden This Fall.—*Five Mondays, 10:30 a.m., October 5 to November 9 (omitting October 12).* Getting ready for next year's Victory Garden. Soil improvement by means of cover crops; fall planting for early vegetables; pruning; propagating; planting useful and ornamental trees and shrubs; dormant spraying; putting the garden to bed. *No fee.* Mr. Free.

V2. Fall Garden and Greenhouse Work.—*Four Tuesdays, 10:30 a.m., October 6 to 27.* A companion course to V9 (Spring Garden Work). Outdoor demonstrations of garden work to be done in the fall. Lifting of tender perennials and seedling annuals; making cuttings for winter and early spring bloom indoors.

FIG. 2. Class of adults in "House Plants." Lecture work is supplemented by practical instruction in the conservatories. See Fig. 3. (6630)

Open only to former members of A25 (Fundamentals of Gardening) or A26. Registration limited to 40 persons. *Fee to non-members, $5 (including laboratory fee); to members, $3 laboratory fee.* Miss Dorward.

V3. Herbs: Their Cultivation and Uses.—*Four Mondays, November 2, 9, 16, 11 a.m.; and Nov. 23, 2:30 p.m.* A series of lectures and demonstrations. *Fee to non-members, $5.*

November 2. Herbs for the small garden, and how to grow them. Miss Van Brunt.

November 9. Use of Herbs in Cooking. Practical demonstrations.
Mrs. H. K. Svenson, Instructor, Home Economics Department, New York University.

November 16. Distillation from Herbs. Actual processes shown.
Mr. Clarke E. Davis, Vice President and Technical Director, Virginia Dare Extract Co., Inc.

November 23.

1. Identification of Herbs. Dr. Svenson.
2. Herb Teas. Dr. Cheney.

Herb teas will be served. Please note that this last period (November 23) begins at 2:30 p.m.

V4. Gardening Indoors.—*Five Wednesdays, 11 a.m., November 4 to December 2.* House plants for decoration and interest. How to make them thrive. Raising new plants, which become the property of class members. Instruction in potting, making cuttings, mixing soils, etc. On account of limited space in the greenhouses, this class must be limited to 50 persons. Registration according to the order of application. *Fee to non-members, $8 (including laboratory fee); to members, $3 laboratory fee.* Mr. Free.

V5. Books on Gardening.—*Three Thursdays, 11 a.m., December 3 to 17.* A series of informal talks. *No fee.*

December 3. Books for Victory Gardening. Mr. Free.

December 10. Garden Books for Children's Work and for Holiday Gifts. Miss Shaw.

December 17. The Library of the Brooklyn Botanic Garden. Mr. Jordan.

Winter

"Information Please."—*One session, Tuesday, February 2, 10:30 a.m.* An hour of consultation for those who are planning their 1943 Victory Garden. Bring your garden problems. *No fee.* Mr. Free.

V6. Gardening for Beauty.—*Four Wednesdays, 10:30 a.m., February 3 to 24.* A series of lectures on ornamental planting. *Fee to non-members, $3 for the course; $1 for a single lecture.*

February 3. Planning the Home Garden.
Mr. H. R. Sebold, Associate in Landscape Architecture, Columbia University.
February 10. Selection of Trees and Shrubs. Mr. Doney.
February 17. Color Schemes in the Garden. Miss Carroll.
February 24. Choosing Herbaceous Material. Miss Clarke.

V7. Useful Plants.—*Four Mondays, 11 a.m., February 8 to March 8 (omitting February 22).* A series of lectures on plants of importance to human beings. *No fee.*

February 8. History of Garden Flowers and Vegetables.
Miss Dorward.
February 15. Food plants of the Early Colonists.
Miss Rusk.
March 1. Economic Plant Products and Possible Substitutes. Dr. Svenson.
March 8. Medicinal Plants. Dr. Graves.

Spring

V8. Fundamentals of Gardening: The Flower Garden.—*Five Wednesdays, 10:30 a.m., February 24 to March 31 (omitting March 17).* The preparation of soil, pruning of roses, raising of seedlings; greenhouse and practical work in pricking. Class limited to 45 persons. *Fee to non-members, $8 (including laboratory fee); to members, $3 laboratory fee.* Miss Shaw, Miss Dorward.

V9. Spring Garden Work.—*Six Tuesdays, 10:30 a.m., March 2 to April 13 (omitting March 16).* The herbaceous border; the lawn; trees and shrubs; practical work in the greenhouse

raising annuals and perennials from seed. Class limited to 45 persons. Open only to those who have completed V8 (A25. Fundamentals of Gardening). *Fee to non-members, $8 (including laboratory fee); to members, $3 laboratory fee.* Miss Dorward.

V10. Gardening for Food and Vitamins.—*Six Thursdays, 10:30 a.m., March 4 to April 8.* Getting the most from a small plot by companion and succession cropping. Soil improvement and maintenance of fertility. Seed sowing, indoors and out; thinning; cultivating; harvesting and storing. Vegetables which usually are raised under glass are started by class members, who have the privilege of keeping the young plants thus raised. Largely seeing and doing. Limited to 50 persons. *Fee to non-members, $8 (including laboratory fee); to members, $3 laboratory fee.* Mr. Free.

V11. Gardening for Victory: Beginner's Course.—*Five Fridays, 10:30 a.m., March 5 to April 2.* How to brighten your surroundings and raise food economically. The cultivation of easy-to-raise vegetables and flowers, especially in small gardens. Lectures and demonstrations. *No fee.* Mr. Free, Miss Dorward.

V12. Gardening for Victory: Advanced Course.—*Three Mondays, 10:30 a.m., March 15, April 5, April 12.* A practical course planned especially for those who took Victory Garden courses last year. Includes soil mixing and sterilizing, seed sowing, and pricking off in greenhouses; demonstrations and practice in the outdoor garden, of soil preparation, drill making, seed sowing, and transplanting; discussion of insect and fungous pests. Largely seeing and doing. Limited to 40 persons. *Fee to non-members, $5 (including laboratory fee); to members, $3 laboratory fee.* Mr. Free, Miss Dorward.

A. Regular Courses for Members and the General Public

Fall

***A5. Trees and Shrubs in Winter.**—*Ten Saturdays, 2:30 p.m., October 3 to December 5.* Outdoor lessons, in the parks and woodlands of Greater New York, on the characteristics of our

* All starred courses are open for university or college credit to students of Long Island University and Brooklyn College. See pages 212 and 227.

FIG. 3. Plant propagation for adults. Practical work in the instructional greenhouse. (8950)

common trees and shrubs, both native and cultivated, emphasizing their distinguishing features in the winter condition. The habits, requirements as to soil, etc., and the use of various species in landscape art are also discussed. *Fee to non-members, $5.* The first session will be held at the Brooklyn Botanic Garden.

Dr. Graves, Miss Ashwell.

A6. Shade Trees.—*Six Mondays, 4 p.m., September 28 to November 9 (omitting October 12).* Meetings in the Botanic Garden to consider the various shade trees. Their distinguishing characters will be studied, as well as their cultivation, and the control of insect and fungous pests. *Fee to non-members, $3.*

Mr. Doney.

A13. Fall Wild Flowers and Ferns: Field Course.—*Five Saturdays, 2:30 p.m., September 19 to October 24 (omitting October 10).* Trips in the Botanic Garden and in the woodlands near the City, to learn to recognize the fall-blooming plants of woods and road-sides, and the fruits of wild plants. *Fee to non-members, $2.50.* First meeting at the Botanic Garden. Miss Rusk.

A14. Fall Wild Flowers in the Botanic Garden.—*Six Fridays, 10:45 to 12:15, September 18 to October 23.* Visits to the Wild Flower Garden of the Brooklyn Botanic Garden, where a large proportion of our most attractive native plants are growing. No rough walking. *Fee to non-members, $3.* Miss Rusk.

A15. Native Ferns in the Botanic Garden.—*Four Mondays, 6 to 7 p.m., September 14 to October 5.* Meetings in the Wild Flower Garden of the Brooklyn Botanic Garden, where about twenty-five kinds of our native ferns are growing. Sure and easy ways of knowing these ferns are pointed out. No rough walking. (Spring course A16, page 225, is similar.) *Fee to non-members, $2.* Miss Rusk.

A18. Wild Flowers and Ferns: Laboratory Study.—*Thirty Thursdays, 4 to 6 p.m., beginning September 24.* A series of two-hour sessions for those who wish to become better acquainted with wild flowers. Plants are studied for flower structure and family relationships, compared and identified, and mounted as permanent specimens. Fresh plants are pressed during the growing season; dried and preserved plants are used in the winter. The course is most valuable when taken with field courses A11 or A12 and A13

or A14, but it may be taken alone. *Fee to non-members, $10 (including laboratory fee); to members, $5 laboratory fee.*

Miss Rusk.

***A31. Ornamental Shrubs: Fall Course.**—*Eight Wednesdays, 4 p.m., September 16 to November 4.* Outdoor sessions in the Botanic Garden, to study the common species and varieties of cultivated shrubs, emphasizing those desirable for planting on the home grounds. Fall flowers and fruits of ornamental shrubs and small trees, also evergreen shrubs, are considered. This is a continuation of the spring course, A30. *Fee to non-members, $4.*

Mr. Doney.

A43. Gardens within a Garden.—*Four Tuesdays, 4 p.m., September 29 to October 20.* Trips designed especially for Members of the Garden and the Institute as a whole, to enable them to become acquainted with the general plan of the Garden and the nature of the various special gardens, as well as other features of general interest. On each occasion, a specialist on the feature of the day will be present to explain details and answer questions. *No fee.* The schedule follows:

September 29. The Water Lilies and the Herb Garden.
Mr. Free.

October 6. The Wild Flower Garden. Dr. Svenson.

October 13. The Rose Garden and the Overlook.
Mr. Free, Mr. Tilley.

October 20. The Oriental Garden. Miss Averill.

A45. Herbaceous Plants: Fall Course.—*Five Wednesdays, 11 to 12:15, September 16 to October 14.* Meetings for the study of fall-flowering garden plants on the grounds of the Botanic Garden. Small specimens for pressing, and occasional propagative material are given to class members. *Fee to non-members, $3.*

Miss Clarke.

Winter

A2. Botanical Drawing.—*Ten Fridays, 10:30 to 12:30, beginning December 4.* Instruction in drawing botanical specimens in black and white. An elementary knowledge of drawing is a prerequisite. *Fee to non-members, $10 (including laboratory fee); to members, $5 laboratory fee.* Miss Purdy.

A22. Plants of Tropical America.—*Six Wednesdays, 3 p.m., January 13 to February 17.* Guided tours through the Conservatories of the Botanic Garden, with informal, non-technical talks on plants there which are important economically or of especial interest. *No fee.*

January 13 and 20. Food and beverage plants.
January 27. Rubber, gum, and medicinal plants.
February 3. Fiber plants.
February 10. Desert plants.
February 17. Insectivorous plants and air plants.
Dr. Graves, Miss Rusk, Miss Ashwell.

A34. Ornamental Shrubs: Winter Course.—*Eight Wednesdays, 4 to 5:15 p.m., January 13 to March 3.* A series of meetings for the study of herbarium specimens and illustrations, with some time devoted to the various methods of propagation. *Fee to non-members, $4.* Mr. Doney.

A50. Herbaceous Plants: Winter Course.—*Ten Wednesdays, 11 to 12:30, January 13 to March 17.* A series of meetings for the study of pressed specimens and illustrations of herbaceous plants, arranged by families. *Fee to non-members, $5.*
Dr. Gundersen and Miss Clarke.

Spring

A8. Trees in the Botanic Garden.—*Ten Mondays, 4:15 to 5:30 p.m., April 12 to June 14.* Outdoor meetings in the Botanic Garden to study more than 100 species of trees, native and cultivated, growing in the Garden, including their economic uses and value in landscape art. *Fee to non-members, $5.*
Dr. Graves, Dr. Gundersen.

***A9. Trees and Shrubs in Spring and Summer.**—*Ten Saturdays, 2:30 p.m., April 10 to June 12.* Outdoor lessons in the parks and woodlands of Greater New York. Similar to A5, except that the different species are studied in their spring and summer conditions. *Fee to non-members, $5.* Dr. Graves, Miss Ashwell.

A11. Wild Flowers and Ferns: Field Course.—*Six Saturdays, 2:30 p.m., April 24 to June 5 (omitting May 29).* Trips in

FIG. 4. Boys and girls receive practical lessons in the instructional greenhouse. (4552)

the Brooklyn Botanic Garden and in the woodlands near the City, for field identification of flowers and ferns of spring and early summer. *Fee to non-members, $3.* First meeting at the Botanic Garden. Miss Rusk.

A12. Spring Wild Flowers in the Botanic Garden.—*Section 1, seven Friday mornings, 10:45 to 12:15, April 23 to June 4. Section 2, seven Monday evenings, 6:30 to 8, April 26 to June 7.* Visits to the Wild Flower Garden of the Brooklyn Botanic Garden, where a large proportion of our most attractive native plants are growing. No rough walking. *Fee to non-members, $3.50.* Miss Rusk.

A16. Native Ferns in the Botanic Garden.—*Four Wednesday evenings, 6:30 to 7:30, May 12 to June 2.* Meetings in the Wild Flower Garden of the Brooklyn Botanic Garden, where about twenty-five of our native ferns are growing. Sure and easy ways of knowing these ferns are pointed out. No rough walking. (Similar to Fall Course A15, page 221.) *Fee to non-members, $2.* Miss Rusk.

***A30. Ornamental Shrubs: Spring Course.**—*Ten Wednesdays, 11 a.m., April 7 to June 9.* Outdoor meetings on the grounds of the Botanic Garden. The principal flowering shrubs and small trees are considered at their times of flowering, emphasis being placed on their uses in plantings, their cultivation, and distinguishing characters. *Fee to non-members, $5.* Mr. Doney.

A37. Lilacs in Flower.—*Four Tuesdays, 11 to 12:15, May 4, 11, 18, and June 8, and one Thursday* to be arranged. Five outdoor lessons. The comprehensive collection of the Garden affords opportunity for the study of about twenty species and some two hundred of the finest varieties of lilacs. In the last lesson, culture and propagation are taken up; cuttings, which become the property of those taking the course, are prepared for rooting. *Fee to non-members, $2.50.* Dr. Gundersen, Mr. Doney, Mr. Free.

A39. Herbaceous Plants: Spring Course.—*Ten Wednesdays, 4:15 to 5:30 p.m., April 14 to June 16.* Trips in the Garden for the study of herbaceous plants in flower. The general characteristics of the principal garden perennials and annuals are pointed out. Small specimens for pressing, and occasional propagative material, are given to class members. *Fee to non-members, $5.* Miss Clarke.

A44. Gardens within a Garden.—*Seven Tuesdays, 4 p.m., April 13, 20, 27, May 4, 18 25, and June 1.* A course designed especially for Members of the Garden and of the Institute, to enable them to become acquainted with the general plan of the Botanic Garden and the nature of the various special gardens, as well as other features of general interest. The schedule of individual trips will be announced later. *No fee.*

Dr. Graves, Miss Rusk, Miss Ashwell.

FLOWER DAYS

To afford an opportunity to members to see the various floral features of the Garden and the special outdoor collections when they are at their best, the following "Flower Days" are held according to announcements. Because of the vagaries of the seasons from year to year, no definite dates can be set at this time, but definite announcements will be sent to all Botanic Garden members from ten days to two weeks in advance. Each event will be in charge of a specialist on the particular flower concerned.

Apple and Cherry Blossom Day: about May 1. Dr. Reed.
Lilac Day: about May 15. Dr. Gundersen.
Iris Day: about May 20. Dr. Reed.
Wild Flower Garden Day: May or October. Dr. Svenson.
Annual Rose Garden Day: second Tuesday in June.
Mr. Free, Mr. Tilley.
Fall Rose Garden Day: early October. Mr. Free, Mr. Tilley.
Herb Garden Day: October. Mr. Free.
Chrysanthemum Day: late October. Mr. Free.

B. Courses for Teachers

These courses have been accepted by the Board of Education of New York City for "in-service credit," one credit being granted for each 15 hours (with the exception of "B2, The Nature Room," and "B8, Plant Culture"). Through an agreement with Long Island University, undergraduate credit for certain courses will be allowed toward fulfilling the requirements for a university degree, provided the admission requirements at the University and the laboratory requirements at the Botanic Garden have been ful-

filled. Such courses are starred (*). By special arrangement with the institution concerned, these credits have also been used as undergraduate credits in other colleges and universities. Nature materials used in the courses, and plants raised, become the property of the student. Long Island University students desirous of electing any of these or of the other courses should notify Dean Tristram W. Metcalfe or Dr. Ralph H. Cheney, who will give the candidate a card entitling him to admission to the course. The student should present this card at the beginning of the first session of the course.

B2. The Nature Room.—*Four Thursdays, 4 p.m., October 8 to 29.* How to arrange and care for box gardens, hanging baskets, and Wardian cases. Practical work will be done in the greenhouse, and plants used by the students become their property. No Board of Education credits. *Fee to non-members, $3 (including laboratory fee); to members, $2 laboratory fee.*

Miss Shaw, Miss Dorward, Miss Hammond.

B3. Elements of Horticulture.—*Thirty Wednesdays, 4 p.m., beginning September 30.* For teachers only. This course is especially recommended by the Board of Education. Garden work outdoors and in the greenhouse. Taking up plants, making cuttings, propagation by different methods, study of soils. How to plan the spring garden; raising seedlings. Limited to 60. Two credits. (No students admitted for a half-year of work.) *Fee to non-members, $10 (including laboratory fee); to members, $7 laboratory fee.*

Miss Shaw, Miss Dorward.

B5. Garden Practice.—For teachers only. Offered as Nature-Garden Science, in conjunction with the Board of Education. For details see Board of Education Announcement of Courses.

Mr. Marvin M. Brooks, Miss Shaw, Miss Miner.

B7. Greenhouse Work.—*Thirty Tuesdays, 4 p.m., beginning October 6.* Designed for those teachers who have completed B3 to continue study of indoor culture of plants. Lectures, demonstrations and practical greenhouse work on propagating and growing many different types of flowering and foliage house plants. Two credits. *Fee to non-members, $10 (including laboratory fee); to members, $7 laboratory fee.*

Miss Dorward.

FIG. 5. First hand study of cereal grains by boys of Haaren High School, Manhattan. (6890)

B8. Plant Culture.—*Twenty Thursdays, 4 p.m., beginning October 22.* A course for those who have completed B3 and B7. All work is done in the greenhouses. No Board of Education credits are given for this course. *Fee to non-members, $10 (including laboratory fee); to members, $7 laboratory fee.*

Miss Shaw, Miss Dorward.

***B10. Wild Flowers and Ferns: Laboratory Study.**—*Thirty Thursdays, 4 to 6 p.m., beginning September 24.* Same as course A18. See p. 221. Four credits for the laboratory course. For combinations of laboratory and field work, two credits for each thirty hours approved. *Fee to non-members, $10 (including laboratory fee); to members, $5 for laboratory fee.* Miss Rusk.

***B13–14. Trees and Shrubs of Greater New York.**—*Twenty Saturdays, 2:30 p.m., October 3 to December 5; and April 10 to June 12, 1943.* Two-hour sessions. A course of outdoor lessons in the parks and woodlands of Greater New York, the principal object being to learn to know the common trees and shrubs, both native and naturalized, of the eastern United States, which are well represented in this region. The species are considered in systematic order, in both winter and summer conditions, and the outstanding features pointed out by which they may most easily be recognized. Two credits. *Fee to non-members, $10.*

Dr. Graves, Miss Ashwell.

C. Children's Courses.

More than thirty separate courses are given Saturday mornings for boys and girls from eight to nineteen years old in the spring, fall, and winter.

The children are grouped according to age and experience. For example, under I (below), twelve separate courses are given; under II, four separate courses; under III, fourteen. Under IV, Outdoor Garden Course, 200 children are working from late April to mid-September. This does not represent one course, but many courses combined under one heading. Miss Shaw and Assistants.

I. Fall Course.—*Ten Saturday mornings, 9–11:15, October 17 to December 19.* Nature study on the grounds; plant propagation in the greenhouse, using stem and leaf cuttings; bulbs and

corms; making of terrariums and dish gardens. Enrollment limited to 175. *Fee, fifteen cents for the course.*

II. Winter Course.—*Six Saturday mornings, 9–11:15, January 16 to February 20.* Children who have shown unusual ability are chosen from the fall group for early winter work. Group limited to 50. *No fee.*

III. Spring Course.—*Seven Saturday mornings, 9–11:15, February 27 to April 10.* Nature study and preparation for the outdoor garden, including studies of seed germination, seed sowing in the greenhouse, and the making of garden plans. All candidates for the outdoor garden must be in spring classes. Enrollment limited to 200. *Fee, fifteen cents for the course.*

IV. Outdoor Garden Course.—*Begins April 24.* The outdoor garden is open throughout the summer season, and time is arranged to fit in with children's vacation schedules. No child is assigned an outdoor garden who has not had the spring preparatory work. Group limited to 200 children. *Fee, twenty-five or thirty-five cents, depending on the size of the garden.*

D. Courses for Special Groups

D1. Medicinal Plants.—*Hours to be arranged.* A course given in both spring and fall, for nurses-in-training, arranged in cooperation with various hospitals. Outdoor trips in the Botanic Garden and trips in the greenhouse to see officinal plants and tropical food plants. Lectures on the care of flowers and plants in the sick room, and demonstrations of some of the major principles governing the life of plants. *No fee.* Dr. Graves.

D2. Trees and Shrubs: Spring Course for Employees of the Park Department and Others.—*Ten Thursdays, 2:30 p.m., April 15 to June 17.* Trips in the parks and woodlands of New York to become acquainted with the common kinds of woody plants, both native and cultivated, during the growing season. The habits, rate of growth, economic value, and importance in forestry, horticulture, and landscape art are discussed. *Fee to non-members, $5.* First meeting at Brooklyn Botanic Garden. Park employees will arrange with their supervisors the necessary time for attending. Dr. Graves, Mr. Doney.

D3. Trees and Shrubs: Fall Course for Employees of the Park Department and Others.—*Ten Thursdays, 2:30 p.m., October 8 to December 17 (omitting Thanksgiving Day).* Trips in parks and woodlands of New York to become acquainted with the common kinds of woody plants, both native and cultivated. Similar to D2 except that in this fall course the winter characters are studied. *Fee to non-members, $5.* First meeting at Brooklyn Botanic Garden. Park employees will arrange with their supervisors the necessary time for attending. Dr. Graves, Mr. Doney.

D4. Gardening: for Employees of the Park Department.—*Twelve Wednesdays, 3:30 p.m., September 23 to December 16 (omitting the day before Thanksgiving Day).* Soils and fertilizers; planting and transplanting (trees, shrubs, bulbs, perennials, etc.); lawn-making and maintenance; herbaceous perennials, including bulbs; annuals and biennials; rose growing, rock and water gardens; insect and fungous pests; pruning; plant propagation; principles of greenhouse management. *Fee to non-members, $6.* Park employees will arrange with their supervisors the necessary time for attending. Mr. Free.

E. Investigation

1. *Graduate Work for University Credit*

By the terms of a cooperative agreement between New York University and the Brooklyn Botanic Garden, properly qualified graduate students may arrange to carry on independent investigations in botany at the Garden under the direction of members of the Garden Staff, who are also officers of instruction in the Graduate School of the University. The advantages of the library, laboratories, herbarium, and collections of living plants at the Garden are freely at the disposal of students registered at New York University for such work. Such properly enrolled graduate students are charged no additional fees by the Garden.

Research work in botany presupposes a knowledge of plants obtained from a study in field and laboratory. Prerequisites include college courses along such lines as morphology, physiology, taxonomy, and genetics. Bacteriology and mycology are special prerequisites for E6. For E8, plant pathology and basic training in forestry are also required.

FIG. 6. Classes from Public School 44, Staten Island, visiting the Botanic Garden for outdoor study of plants. Classes come to the Garden for instruction from all five Boroughs of Greater New York. (9607)

E6. Research in Mycology and Plant Pathology. Dr. Reed.
E8. Research in Forest Pathology. Dr. Graves.
E9. Research in the Systematic Botany of the Flowering Plants. Dr. Svenson.
E10. Research in the Structure of Flowers. Dr. Gundersen.

2. Independent Investigation

The facilities of the laboratories, conservatories, library, and herbarium are available to qualified investigators who wish to carry on independent researches in their chosen field of botany. By "qualified investigators" is meant those who have obtained the doctor's degree or have completed most of the requirements for the doctorate. The laboratories are open for such use only during the hours when the Laboratory Building is regularly open, viz. 9 a.m.–5 p.m. Mondays to Fridays; 9–12 a.m. Saturdays, except on holidays, when the building is closed. There is a charge of $25 per year, payable to the Botanic Garden.

COOPERATION WITH LOCAL SCHOOLS

The Brooklyn Botanic Garden aims to cooperate in every practicable way with the public and private schools of Greater New York in all matters pertaining to the study of plants and closely related subjects. The purpose of the Garden in this connection is to supplement and enrich the school work in the way of instruction, demonstration methods, study material, etc., which otherwise would not be available.

Geography classes, as well as classes in nature study and botany, find the collection of useful plants in the Economic Plant House, the Local Flora Section, the Oriental Garden, the Herb Garden, and also the Meridian Panel, the Armillary Sphere, and the Labeled Glacial Boulders, valuable adjuncts to their class work. Arrangements may be made by teachers of geography to have their classes study these features under guidance. Illustrated lectures at the Garden for geography classes may also be arranged.

To visiting college classes in geology and physiography the Botanic Garden offers interesting material for a study of glaciation. Notable features are a portion of the Harbor Hill terminal moraine

(Boulder Hill), the morainal pond (the "Lake"), the labeled glacial bounders, and the Flatbush outwash plain. See Guide No. 7, *"The Story of our Boulders: Glacial Geology of the Brooklyn Botanic Garden."*

Talks at Elementary Schools.—The war has made it impossible for public school classes to visit the Botanic Garden, and so the Garden is offering a short series of talks to be given at the schools on Mondays and Fridays. The number of speakers going out on any one day is limited because of other activities at the Botanic Garden. All talks will be illustrated with lantern slides; the lantern and operator must be provided by the school; slides will be furnished by the Botanic Garden. Address the *Curator of Elementary Instruction* for appointments.

Talks at Secondary Schools and Colleges.—Informal illustrated talks on various subjects of an advanced botanical nature are always gladly given at Secondary Schools and Colleges by members of the staff. Arrangements for such talks should be made with the *Curator of Public Instruction.*

School Classes at the Garden.*—Public or private schools, both elementary and secondary, may arrange for classes to come to the Botanic Garden for illustrated lectures by a member of the Garden staff, or for guided tours of instruction through the conservatories and outdoor plantations. Such lectures, conservatory trips, and outdoor trips are planned for correlation with the New York City school syllabi in nature study, biology, and geography.

Visiting classes must be accompanied by their teachers, and notice of such visits should be sent at least one week in advance. Blank forms for this purpose are provided by the Garden. Lists of talks and trips offered will be sent on request: for Junior High and Elementary Schools address the *Curator of Elementary Instruction;* for High Schools, the *Curator of Public Instruction.*

The Garden equipment, including plant material, lecture rooms, lantern, and slides, is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be

* Visits to Botanic Gardens and Museums by Public School classes have been generally discontinued by the Board of Education for the duration of the war. Visits by classes from Private Schools and Colleges will be scheduled in harmony with existing regulations.

made in advance, so that such work will not conflict with other classes and lectures. For High School and College classes address the *Curator of Public Instruction.* For Junior High and Elementary School classes address the *Curator of Elementary Instruction.*

The principal of any Elementary or Junior High School in Brooklyn may arrange also for a series of six lessons on plant culture to be given to a class during the fall or spring. A small fee is charged to cover the cost of the materials used. The plants raised become the property of the pupils. The lessons are adapted for pupils above the third grade.

Seeds for School and Home Planting.—Penny packets of flower and vegetable seeds are put up by the Botanic Garden for children's use. In the early spring, lists of these seeds, order blanks for teachers and pupils, and other information may be secured on application to the *Curator of Elementary Instruction.*

Demonstration Experiments.—Teachers may arrange to have various physiological experiments or demonstrations conducted at the Garden for the benefit of their classes. Communications in regard to these matters should be addressed to the *Curator of Public Instruction.*

Loan Sets of Lantern Slides.—Sets of lantern slides have been prepared for loan to the schools. Each set is accompanied by a short lecture text of explanatory nature. In all cases these sets must be called for by a responsible school messenger and returned promptly in good condition. Address, by mail or telephone (Main 2–4433), Mr. Frank Stoll, custodian. The subjects now available are as follows. Other sets are in preparation.

1. Plant Life
2. Common Trees
3. Forestry
4. Soil Conservation
5. Conservation of Native Plants
6. Spring Wild Flowers
7. Summer Wild Flowers
8. Fall Wild Flowers
9. Ferns and Fern Allies

Study and Loan Material for Elementary Schools.—To the extent of its facilities, the Botanic Garden will provide, on request, various plants and materials for nature study. As far as possible this material will continue to be supplied gratis to elementary

FIG. 7. Boys and girls studying trees in winter. Division into small groups insures better educational results. (6475)

schools. Requests from Elementary Schools should be made to Miss Elsie T. Hammond, and material should be called for at the Information Booth on the ground floor.

Study and Loan Material for Colleges, High Schools, and Junior High Schools

Available at the Brooklyn Botanic Garden, 1942–1943

The Botanic Garden is able to supply various plants and plant parts for study; certain protozoa; sterilized nutrient agar; and also material and mounts for exhibit purposes. When containers are necessary, as in the case of agar, algae, and protozoa, they must be furnished by the school.

In the past, the Garden has offered this service gratis, but both on account of the increasing demand and because of the decrease in appropriations, it has become necessary to make a small charge for the material supplied or loaned. A Price List of the various materials furnished will be mailed on request.

Requests should be made by mail or telephone (Main 2–4433), at least one day in advance, to Miss Jeanne P. Walther, and the material should be called for at Room 204. Unpotted material will be mailed if the school pays postage.

Living Material—Plants

Algae: Spirogyra, fresh, and preserved conjugating. Other algae.
Fungi: Plus and minus strains of *Rhizopus nigricans, Absidia,* and *Phycomyces.* Cultures with zygospores.
Liverworts: Conocephalum, Marchantia thallus, with or without gemmae cups.
Mosses: Protonema, Felt, Felt with capsules.
Ferns: Prothallia, Fronds with spores.
Plant material for photosynthesis experiments: Green geranium, Silver geranium, Coleus, Tradescantia.
Other plant material: With fleshy leaves—Bryophyllum, Sedum; *Water Plants*—Elodea, Duckweed; *Sensitive Plant—Mimosa pudica.*
Leaves: Sedum, Sansevieria, Cherry, Apple, Basswood (in season).

FIG. 8. The Children's Garden, conducted primarily as an educational discipline. The importance of a good crop is not lost sight of. Accommodation, 200 boys and girls. The Model Victory Garden is an added feature here in 1942. (5107)

Stems: Twigs to show buds and leaf scars; preserved Corn stems.
Seeds: For study of root hairs and germination—Castor bean, Garden bean, Lupine, Peas, Oats, Corn, Sorghum, Wheat.
Stem cuttings: Tradescantia, Begonia, Coleus, Geranium, English ivy, Willow.
Genetics material: Sorghum seeds for growing F_2 seedlings showing red and green seedling stem characteristics with 3:1 ratios. Sorghum seeds giving normal and albino 3:1 ratios. Pea seeds of tall and dwarf strains. Seedlings of any of the above.

Living Material—Animals

Protozoa: Cultures of Paramecia, Euglena.

Sterilized Agar

Petri dishes, test tubes, or flasks, sent in clean and dry, one week in advance, will be filled with sterile nutrient agar, or with potato dextrose agar for the study of bacteria and molds.

Specimens and Mounts for Exhibit

Illustrating the principles of genetics:
Pea seeds illustrating a dihybrid ratio (wrinkled, smooth, yellow, green)—Riker mounts or vials.
Jimson weed (Datura)—Mount to show F_2 segregation of spiny and smooth pods.
Corn showing monohybrid and dihybrid ratios:
Unmounted, in glass tubes, or in display cases.
Sorghum—Hybrid vigor—Riker mount.
Sorghum—Inheritance of seed color—Riker mount.
Oats—Inheritance of hull color—Riker mount.

BUREAU OF PUBLIC INFORMATION

Consultation and advice, and the facilities of the library and herbarium are freely at the service of members of the Botanic Garden and (to a limited extent) of others with special problems relating to plants or plant products, especially in the following subjects:

1. The care of trees, shrubs, and lawns; and general gardening problems.
2. The growing of cultivated plants and their arrangement; also their adaptation to soils, climate, and other factors.
3. Determination (naming) of flowering plants.
4. Plant diseases and determination of fungi.
5. Plant geography and ecology.

Inquiries should be directed to the *Curator of Public Instruction,* preferably by letter.

Determination of Specimens.—If the identification of plants is desired, the material submitted should include flowers, and fruit when obtainable. Identification of a single leaf is often impossible. For identification of plant diseases, representative portions of the part diseased should be sent.

DOCENTRY

To assist members and others in visiting the plantations the services of a docent may be obtained. Arrangements should be made by application to the *Curator of Public Instruction* one week in advance. No parties of less than six adults will be conducted. This service is free of charge to members and accompanying friends; to others there is a charge of 50 cents per person. For information concerning membership in the Botanic Garden see pages i–v of this PROSPECTUS.

EXTRA-MURAL LECTURES

With the exception of talks to schools, the Botanic Garden does not officially schedule members of its personnel for lectures or talks outside the Botanic Garden, except for lectures on the Garden itself or some aspect of its work. In such cases no fee is charged beyond traveling expenses.

Several members of the personnel are available for lectures to garden clubs and other organizations on topics of general horticultural or botanical interest. A list of lecturers, with lecture topics and the fee charged, may be had by addressing the *Curator*

of Public Instruction. Arrangements are to be made directly with the lecturer concerned.

See page iii for special privileges to Member Clubs.

MEETINGS OF OUTSIDE ORGANIZATIONS

The Brooklyn Botanic Garden is glad to welcome outside organizations wishing to hold meetings at the Garden, provided the general purpose of the organization is closely allied to that of the Botanic Garden (e.g., Botanical Groups, Garden Clubs, Nature Study Clubs, Conservation Organizations, etc.), or that the specific purpose of the meeting is of mutual interest and advantage to the organization and the Botanic Garden. Meetings must always be arranged for in advance. A folder giving full details, and an application blank may be had by addressing *The Custodian.*

PLANTATIONS

The horticultural diversity of the plantations has given them the appropriate name of "Gardens within a Garden." In addition to some eight or ten special collections (e.g., Crocus, Daffodils, Flowering Cherries, Flowering Apples, Tulips, Peonies, Lilacs, Iris, Azaleas and Rhododendrons, Cannas, Hardy Chrysanthemums) the plantations comprise the following gardens:

1. General Systematic Section
2. Local Flora Section
3. Children's Garden
4. Oriental Garden
5. Rock Garden
6. Water Gardens (3)
7. Conservatory Garden
8. Laboratory Plaza
9. Shakespeare Garden
10. Horticultural Section
11. Moss Garden
12. Fern Garden
13. Rose Garden
14. Rose Arc
15. Iris Garden
16. Ivy Garden
17. Wall Garden
18. Herb Garden
    - *a.* Culinary Herbs
    - *b.* Medicinal Herbs
    - *c.* Elizabethan Knot Gardens
19. Experimental Garden
20. Nursery

The above collections, all carefully labeled, are, in effect, an outdoor museum of plant life and gardening, and constitute an in-

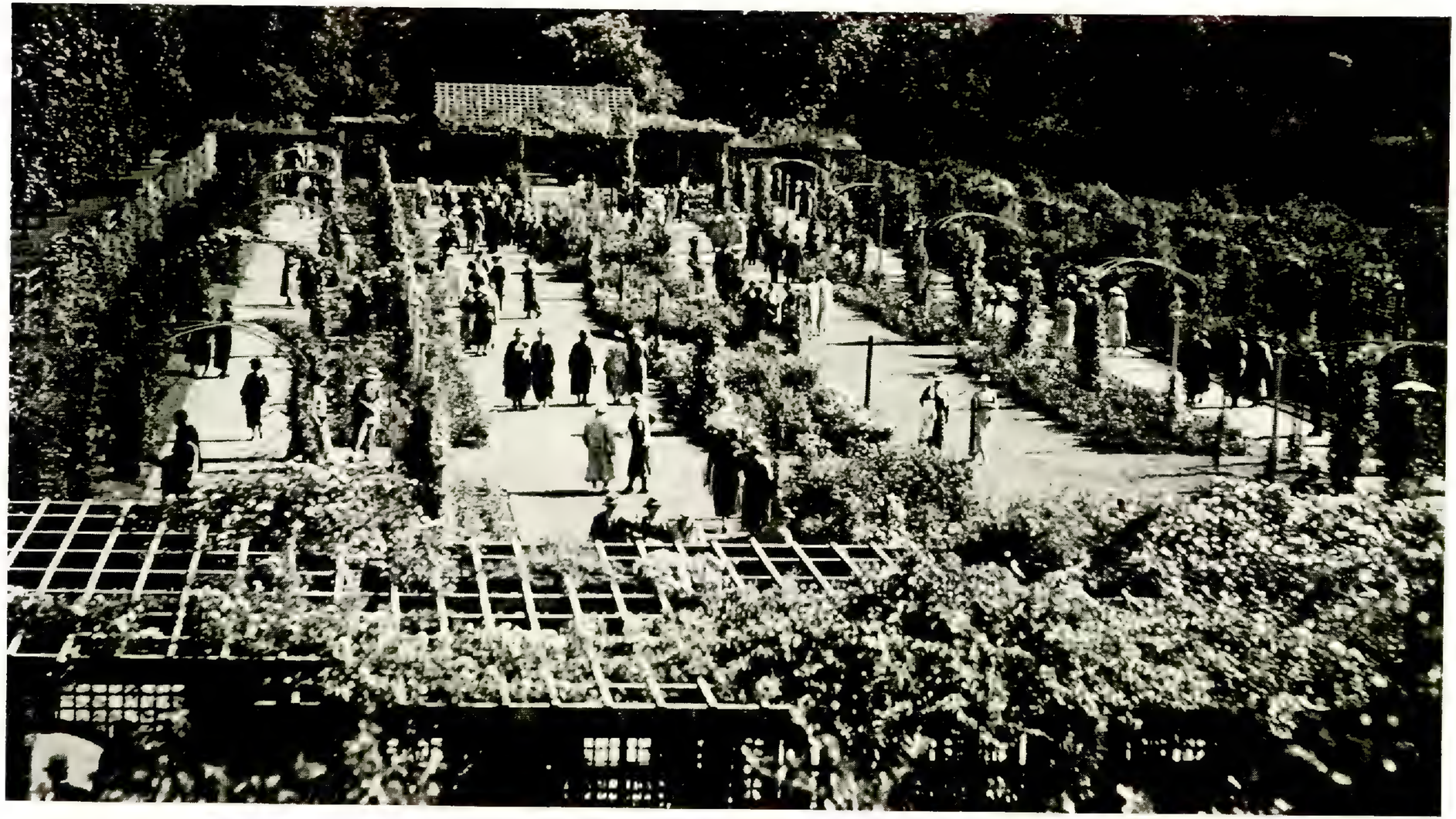


FIG. 9. The Rose Garden is popular for its rare beauty, and invaluable for horticultural instruction. Given by Mr. and Mrs. Walter V. Cranford. The roses are donated by nurserymen. (9322)

dispensable basis for our program of scientific work and public education.

HERBARIA

The Phanerogamic Herbarium consists of more than 215,000 specimens of flowering plants, chiefly from North America. Among the important collections represented is the herbarium of A. A. Heller, containing many of his type specimens, chiefly from the western States and especially rich in *Lupinus*. There are also collections from Suksdorf, Sandberg, Bolander, Hall & Harbour, Nevius, Howell, and others. From the eastern States are the large New Jersey collections of Henry Dautun and C. F. Austin, the herbarium of E. L. Morris (primarily from the District of Columbia), and the miscellaneous collections of Stephen Calverley. Also collections from the Galapagos Islands and the west coast of South America by Dr. Henry K. Svenson. There is a large representation of the Long Island flora including the herbarium of E. S. Miller and selected specimens from William C. Ferguson. In addition, the herbarium contains several collections of very old specimens presumably from the Brooklyn Lyceum of Natural History, apparently the herbarium of William Cooper, and early collections of Torrey, Leavenworth, Croom, and Gates.

The Cryptogamic Herbarium contains a large collection of ferns, mosses, liverworts, lichens, and algae. It also contains the mycological collection consisting of approximately 79,000 specimens of fungi and myxomycetes, including the mycological collection of Dr. Franz Bubák, of Prague, for many years director of the Tabor Botanical Garden. This collection of 33,779 specimens, includes type specimens of more than 500 species new to science, described by Dr. Bubák.

Other exsiccati represented in the Garden herbarium are those of E. Bartholomew; Ellis & Everhart; Jaczewski, Komarow and Tranzschel; W. A. Kellerman; Raciborski; Seymour & Earle; C. L. Shear; H. & P. Sydow; David Griffiths; and others.

These herbaria may be consulted daily (except Sundays and holidays) from 9 a.m. until 5 p.m.; Saturdays from 9 a.m. to 12 m. Specimens may be submitted for identification.

LIBRARY

The rapidly growing library of the Garden comprises at present about 23,000 volumes and about 21,000 pamphlets. This is not a circulating library, but is open free for consultation to all persons daily (except Sundays and holidays) from 9 a.m. until 5 p.m. (Saturdays, 9 to 12). More than 1,000 periodicals and serial publications devoted to botany and closely related subjects are normally received. These include the transactions of scientific societies from all quarters of the globe; the bulletins, monographs, reports, and other publications of various departments of the United States Government, as well as those of foreign governments, and of all state agricultural experiment stations and agricultural colleges; the publications of research laboratories, universities, botanic gardens, and other scientific institutions of the world, as well as the files of independent journals devoted to the various phases of plant life. The library is specially rich in publications of foreign countries and has a growing collection of incunabula and other pre-Linnaean works.

Bibliographical assistance is rendered to readers by members of the Library staff.

An annotated list of the incunabula, pre-Linnaean works, old herbals, and other rare or historically important books in the Library was published as the July, 1935, number of the Botanic Garden RECORD. Copies are for sale at 40 cents each, post free.

INDEX TO VOLUME XXXI

Acanthopanax ricinifolius, 42
Accessions and Distribution, Herbarium, 131
Accessions, Library, 133, 136
Acer, 29, 30, 31, 33
  griseum, 42
  Negundo, 30
  Opalus, 42
  platanoides var. *Schwedleri*, 47
Actinidia chinensis, 121
Addresses, and Papers Given by the Botanic Garden Personnel During 1941, 155
Aesculus carnea, 46
  Hippocastanum, 47
    var. *Baumanii*, 47
Albizzia julibrissin, 41
American Fern Society Collection, 136
American Museum of Natural History, 78
Araucaria excelsa, 78
Attendance at the Garden During 1941, 106, 107
Auxiliary, The Woman's, 79, 168

Beam-Tree, White, 40
Benches, 73
Benedict, Ralph C., 74, 104, 137
Benson, Philip A., 80
Betula, 11
  davurica, 39
  Maximowicziana, 39
  papyrifera, 10
  pubescens, 10
Bequest to the Brooklyn Botanic Garden, Forms of, vi, 50
Bequests, Gifts and, 82
Birch, 11
  Canoe, 10
  Paper, 10
Birches, 10
Birds, Lists of, 113
Bishop, George, 78
Blanton, S. F., 93
Board, Members of the, 167
Boxelder, 30
British Project, 62
Broadcasting, 60
Brooks, Marvin M., 117
Budget, Capital Outlay, 83
  for Year 1941, Maintenance, 141

Carpenter, Mrs. J. Norman, 77
Carroll, Michalena LeFrere, 81, 119
Catalpa Fargesi, 43
Cercidiphyllum japonicum, 40
Chaenomeles sinensis, 40
Cheney, Ralph H., 105, 138
Cherry Walk, 24
Cherries, Flowering, 24, 69
Chestnut Breeding Work in 1941, 94
Chestnut Disease Studies, 67
Children's Courses, 229
Children's Work, Special Gifts for, 143
City, The Botanic Garden and the, vii
Civilian Conservation Corps, The, 77
Clarke, Elizabeth, 81
Classes, Registration and Attendance at, 59
Clay, Virginia A., 81
Club Memberships, iii
Collections Fund, 142
Compensation for per diem men, Better, 89
Conservation Department, New York State, 78
Contributions and Memoirs, 166
Cooperation, 72
  Education, Board of, 74
    Board of Higher, 74
  Entomology and Plant Quarantine, U. S. Bureau of, 73
  Flower Show, International, 75
  Garden Club of America, Horticultural Committee, 76
  Hospitals, Department of, 74
  Museums Council of New York, The, 76
  Parks, Department of, 73
  Schools, 233
  Taft High School, The William Howard, 74
    Various, 127
  Works Progress Administration, 72
Cornus controversa, 43
  florida var. *rubra*, 46
  macrophylla, 43
  Walteri, 43
Corylus Colurna, 39

Courses of Instruction, 212
Adult, 109
Children's, 229
for Members and the General Public, Regular, 215
Special Groups, 230
List of, 213
Culinary Herb Garden, Medicinal and, 126

Daphne mezereum var. *alba*, 121
Davenport, Mrs. Henry J., 134
Davidia involucrata var. *Vilmoriniana*, 1, 42
Defense Emergency, New York City, 57
Deutzia Veitchii, 121
Dicotyledons, Flower Structure and the Classification of, 99
Dipteronia, 33, 30
sinensis, 42
Director, Report of the, 55
Docentry, 240
Dogwood, Pink, 46
Doney, Charles F., 39
Donnelly, Thomas A., 141
Doscher, Mrs. Charles, 110
Dove Tree, 42
Drosera brevifolia, 102

Eastern Parkway, Proposed Main Entrance, 85
Ecology, 165
Economic Plants, 105
Edson, Miss Elma, 119
Education, Adult, 59
Board of, 74
Board of Higher, 74
Public, 58
Ehretia thyrsiflora, 43
Elementary Instruction for 1941, Report of the Curator of, 114
Eleocharis microcarpa, 103
Elm, American, 46
Endowment, 84
Increment Plan, 84
Engler, Adolf, 45
Epaulette Tree, 43
Eucommia ulmoides, 40
Euptelea polyandra, 40
Evodia hupehensis, 41
Exhibit of the week posters, 113
Exhibits, 127
Exploration and Geographical Distribution, 66

Fairchild Connecticut Garden, 81
Faris, James A., 65
Fern Garden, 69
Field Work, Herbarium Research and, 101
Trips Conducted, 1941, 162
Financial, 82
Statement for 1941, 139
Flatbush Avenue entrance, gate at the north, 88
Flower Arrangement, 117
Days, 110, 226
Show Exhibit, 142
Flowering and on Cultural Requirements, Notes on the Time of, 204
Forsythia for Brooklyn, 113
Free, Montague, 75, 78, 110, 128
Funds, 1941, Public and Private, 83
Fusco, Vincent, 78

Gager, C. Stuart, 44, 81, 90
Galapagos Islands, 103
Ganz, Frank, 124
Gardeners, The need for more, 89
Gate at the Eastern Parkway entrance, Proposed, 86
Gaylussacia dumosa, 102
Genetics, 104, 166
Gifts and Bequests, 82
Received During 1941, 142
Gottlieb, Robert, 74
Graduate Work for University Credit, 231
Graves, Arthur Harmount, 94, 1, 67, 114
Guggenheim Foundation, 66
Gundersen, Alfred, 1, 99, 123

Hahn, H. A., 72
Hammond, Miss Elsie Twemlow, 119
Hanmer, C. C., 134
Healy, A. Augustus, 46
Hedera, 75, 126
Helleborus orientalis varieties, 76
Herb Garden, Medicinal and Culinary, 126
Herbaria, 243
Herbarium, The, 72, 130
Accessions and Distribution, 131
Cryptogamic, 132
for 1941, Report of the Curator of the, 128
Phanerogamic, 149
Material Borrowed, 130
Material Loaned, 130
Mycological, 132
Research and Field Work, 101
Hofmann, Tabea, 77
Home for Aged Men and Couples, The Brooklyn, 78

Horsechestnut, 47
Double Flowered, 47
Red Flowered, 46
Horticultural Section, 124
Horticulturist for 1941, Report of the, 124
Hunter, William T., 75

Idesia polycarpa, 42
Information, Bureau of Public, 63, 239
Inspection, Spring, 76
Instruction, Department of Elementary, 149
Elementary, 61
Investigation, 231
Iris Collections, 123
Tall Bearded, 69
Ivy Garden, 69, 125, 126, 127

Jenkins, R. C., 73
Jonelunas, Olga, 94
Jones, D. F., 97
Jones, John C., 78
Jordan, William E., 136
Jurasek, Georgianna, 94

Kalopanax pictus, 42
Katsura-Tree, 40
King, Edward P., 70

Labels and Signs, 123
Labor paid for by Government relief organizations, 124
Laboratory Building: Proposed Addition, 87, 89
Lacquer Tree, 41
LaGrutta, Joseph, 117
Lancaster, Bertha, 119
Lantern Slides, Loan Sets of, 235
Leaflets, 166
Lectures, Addresses, and Papers Given by the Botanic Garden Personnel During 1941, 155
Lectures and addresses, Extra-mural, 60, 240
Library, The, 71, 143, 244
Accessions, Statistical Report on the, 136
for 1941, Report on the, 133
tea, 135
Lilac Day, 110
Lilacs, 120
Linden, Silver, 46
Liquidambar Styraciflua, 45
Liriodendron chinense, 40
Tulipifera, 45
Loan Material for Colleges, High Schools, and Junior High Schools, 237
for Elementary Schools, 235
Loans, Interlibrary, 135
Local Flora Section, The, 70, 128, 183
Guide to the Plantings of the, 191
Location of the Garden, Advantageous, 58
Lycopodium alopecuroides, 102

Maackia amurensis, 41
Magnolia cordata, 121
Maple, Italian, 42
Paperbark, 42
Maples, 30
American, 29
Armistice, 47
Compound-leaved, 33
Old World, 31
Marcy, D. Elizabeth, 82
Maxon, W. R., 137
McFarland, Frank, 73
Medal, Gold, 75
Medicinal and Culinary Herb Garden, 126
Medlar, 40
Meetings of Organizations at Brooklyn Botanic Garden, 1941, 163
Members, List of, 170
Membership, 79
Club, iii
in the Brooklyn Botanic Garden, Privileges of, ii, 52
Information Concerning, v, 51
Privileges, Out-of-Town, iv
Summary of, 182
Memoirs, Contributions and, 166
Merit, Certificate of, 76
Mespilus germanica, 40
Meyerhoff, Gordon, 74
Morris, Charles E., 77
Moses, Robert, 73
Michigan, University of, 119
Miner, Frances M., 82, 119
Moth, European pine-shoot, 4

National Association of Gardeners, The, 78
National Youth Administration, 124
Nephrolepis, Variation in, 104
News Releases, 60
Nurses-in-training, 230

Oak, Black, 46
Chestnut, 47
Overcup, 47

Pin, 46
Red, 46
Swamp Post, 47
Turkey, 14
White, 45
Oaks, 14
American Black, 13
American White, 15
Black, 14
Chestnut, 14
Old World, 17
White, 14
Willow, 14
Oat Smuts, Studies on Experimentally Produced Physiologic Races of the, 92
Oats, A New Race of Loose Smut of, 90
Observers, Student, 124
Officers of the Brooklyn Institute of Arts and Science, 167
Orange, Trifoliate, 41
Organizations, Meetings of Outside, 241
Oxydendrum arboreum, 43

Park Department, 127
Employees, Courses of Instruction for, 73, 230
Parrotia persica, 40
Parrotiopsis Jacquemontiana, 40
Pathogens, Studies of Physiologic Races of Plant, 64
Pathology, Plant, 90
Personnel, 80
and Maintenance, 89
Photographic Work, Report of, 165
Photographing, Painting, and Sketching, Regulations Concerning, viii, 53
Picrasma quassioides, 41
Pierrepont, Anna J., 72
Pine, Red, 4
Pines, 4
Pinus, 5
resinosa, 4
Plant Distribution, Seed and, 127
Plant Pathology Research Fund, 142
Plantations, 69, 241
Plants for 1941, Report of the Curator of, 120
Herbaceous, 122
Living, 147
Statistics Relating to Living, 122
Platt, Rutherford, 114
Platycarya strobilacea, 39
Poage, Ray, 73
Poncirus trifoliata, 41
Porterfield, Willard M., 134
Potamogeton pulcher, 102
Private Funds Accounts, 140
Prospectus: 1942–1943, 211
Pterocarya, 30
stenoptera, 39
Pterostyrax corymbosa, 43
Public Instruction for 1941, Report of the Curator of, 106
Publication, 59
Publications, 1941, Report on Brooklyn Botanic Garden, 165
by Staff members, 60
by the Botanic Garden Personnel During 1941, 150
Publicity, 112
Purdy, Maud H., 1
Putz, Margaret Burdick, 82

Quercus, 13, 15, 17
alba, 45
bicolor, 14
Cerris, 14
dentata, 39
heterophylla, 47
imbricaria, 14
lyrata, 47
montana, 14
myrsinaefolia, 14
palustris, 46
Phellos, 14
prinoides, 14
rubra, 46
velutina, 46
Quince, Chinese, 40

Radio Talks by the Botanic Garden Personnel During 1941, 160
Record, Brooklyn Botanic Garden, 166
Reed, George M., 24, 65, 90, 123
Report of the Brooklyn Botanic Garden 1941, Thirty-First Annual, 55
Research, 63
for 1941, Reports on, 90
Resident Investigator (Economic Plants) for 1941, Report of the, 138
(Ferns) for 1941, Report of the, 137
Retiring allowances, 89
Reynolds, Isabelle R., 46
Rhododendron maximum, 103
Rhus verniciflua, 41
Rhyacionia buoliana, 4
Rhynchospora macrostachya, 102
Riley, Betty G., 82

Rock Garden, Fencing the, 70
Rockefeller, Jr., John D., 84
Rogers, Matilda, 117
Rose Garden, 124
"Roses, Lenten," 76
Rubber Tree, Chinese, 40
Rusk, Miss Hester M., 113

Salix Matsudana var. *tortuosa*, 39
Schizocarp, 30
School Garden Association of New York, The, 78
School Service, Statistics of, 108
Schools, Cooperation with Local, 233
Scleria reticularis, 102
Scott Garden and Horticultural Award, Arthur Hoyt, 81
Scott, Mrs. Arthur Hoyt, 76
Seed and Plant Distribution, 127
Seed Exchange, 122
Seeds, Penny Packets of, 62
Shaw, Ellen Eddy, 46, 119
Shaw Endowment Fund, Ellen Eddy, 142
Shrubs, 121
Silk Tree, 41
Sinnott, E. W., 97
Smith, Floyd F., 73, 93
Smut Infection on Seedlings of Resistant and Susceptible Oat Varieties, The Effect of, 91
Smut Resistance, Studies on the Inheritance of, 90
Smut of Oats, A New Race of Loose, 90
Snyder, Richard, 124
Sorbus Aria, 40
commixta, 41
Sorrel-Tree, 43
Sourwood, 43
Stanton, T. R., 90
Svenson, Henry K., 101, 66, 132, 183
Swanson, Albert, 124
Sweet Gum, 45
Systematic Section, 124

Taft High School, William Howard, 128
Talks, Lectures, Addresses, and Papers Given by the Botanic Garden Personnel During 1941, 155
Tax Budget, 139
Teachers, Courses for, 226
Thrips, Control of Iris, 66
Experiments on the Control of Iris, 93
Tilia tomentosa, 46
Tilley, S. R., 110, 78
Time of Flowering and on Cultural Requirements, Notes on the, 204
Tomatoes, One Ton of, 62
Town Hall Leadership School, 118
Trees, 121
in the Brooklyn Botanic Garden, 1
in the Brooklyn Botanic Garden, Unusual, 39
Memorial and Gift, 44
Triboro Hospital for the Tubercular, 128
Tulip Tree, 45

Ulmus americana, 46
carpinifolia var. *Koopmannii*, 39
U.S.O. Campaign, National, 77
Utter, L. Gordon, 66, 73, 92, 93

Victory Garden Courses, 215
Volunteers, Student, 94
Vries, Hugo de, 45

Walks, 127
Resurfacing the, 70
Walther, Jeanne Phyllis, 82, 91
War on Botanic Gardens, Effect of the, 56
Washington memorial tree, George, 46
White, Alain, 134
White, Alfred T., 45
White, Frances E., 46
White, Harriet H., 46
White Tradition, The Alfred T., 58
Whittingham, Augustus, 69, 129
Wild Flower Garden of Brooklyn Botanic Garden, Native, 183
Wing Nut, 39
Winter Killing, 71
Winter Party, 79
Wisconsin, University of, 119
Works Progress Administration, 124, 127, 135
Woman's Auxiliary, 168

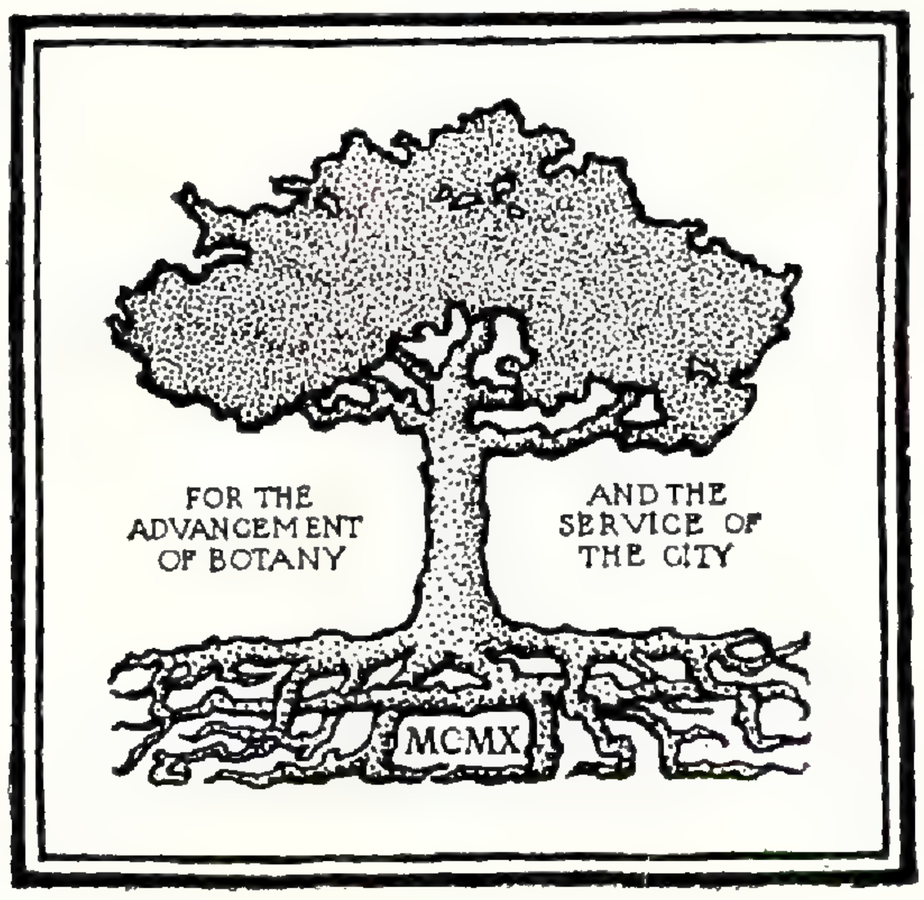
Youth Administration, The National, 78

Zelkova serrata, 40

BROOKLYN BOTANIC GARDEN RECORD

EDITED BY

C. STUART GAGER



VOLUME XXXI

1942

PUBLISHED QUARTERLY

AT PRINCE AND LEMON STREETS, LANCASTER, PA.

BY THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN, N. Y.

LANCASTER PRESS, INC., LANCASTER, PA.

TABLE OF CONTENTS OF VOLUME XXXI

No. 1, January

Trees in the Brooklyn Botanic Garden 1

No. 2, April

Brooklyn Institute of Arts and Sciences . . . . . Preceding page 55
Privileges of Membership . . . . . Preceding page 55
Club Memberships . . . . . Preceding page 55
Out-of-Town Membership . . . . . Preceding page 55
Information Concerning Membership . . . . . Preceding page 55
Forms of Bequest to the Brooklyn Botanic Garden . . . . . Preceding page 55
The Botanic Garden and the City . . . . . Preceding page 55
Regulations Concerning Photographing, Painting, and Sketching . . . . . Preceding page 55
Thirty-First Annual Report of the Brooklyn Botanic Garden, 1941 55
Report of the Director 55
Reports on Research for 1941 90
Report of the Curator of Public Instruction 106
Report of the Curator of Elementary Instruction 114
Report of the Curator of Plants 120
Report of the Horticulturist 124
Report of the Curator of the Herbarium 127
Report on the Library 133
Statistical Report on the Library 136
Report of the Resident Investigator (Ferns) 137
Report of the Resident Investigator (Economic Plants) 138
Financial Statement for 1941 139
Gifts Received During 1941 142
Publications by the Botanic Garden Personnel During 1941 150
Talks, Lectures, Addresses, and Papers Given During 1941 155
Radio Talks by the Botanic Garden Personnel During 1941 160
Field Trips Conducted 162
Meeting of Organizations at Brooklyn Botanic Garden, 1941 163
Report of Photographic Work 165
Officers of the Brooklyn Institute of Arts and Science 167
Members of the Board 167
Woman's Auxiliary 168
List of Members 170
Summary of Membership 182

No. 3, July

Guide to the Local Flora Section (Native Wild Flower Garden) of the Brooklyn Botanic Garden 183

No. 4, October

Prospectus: 1942–1943 211

The Brooklyn Institute of Arts and Sciences

OFFICERS OF THE INSTITUTE

CHAIRMAN, BOARD OF TRUSTEES
EDWARD C. BLUM

PRESIDENT
ADRIAN VAN SINDEREN

FIRST VICE-PRESIDENT
WALTER H. CRITTENDEN

SECOND VICE-PRESIDENT
CHARLES PRATT

THIRD VICE-PRESIDENT
SIDNEY W. DAVIDSON

TREASURER
EDWIN P. MAYNARD

SECRETARY
FRANCIS T. CHRISTY

BOTANIC GARDEN GOVERNING COMMITTEE

MISS HILDA LOINES, *Chairman*

PHILIP A. BENSON, *Vice-Chmn.*
EDWARD C. BLUM, *Ex officio*
WILLIAM G. CREAMER
WALTER H. CRITTENDEN
LEWIS L. FAWCETT
MRS. LEWIS W. FRANCIS
WALTER HAMMITT
WILLIAM T. HUNTER
JAMES G. McDONALD
EDWIN P. MAYNARD
ROBERT MOSES, *Ex officio*
ALFRED E. MUDGE
ADRIAN VAN SINDEREN, *Ex officio*

EX OFFICIO MEMBERS OF THE BOARD

THE FOLLOWING OFFICIALS OF THE CITY OF NEW YORK

THE MAYOR
THE COMPTROLLER
THE COMMISSIONER OF PARKS

GENERAL INFORMATION

MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Contributing Membership, $100 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, N. Y.* Telephone, Main 2–4433.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dusk; on Sundays and Holidays it is open at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard and near Mt. Prospect Park; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 1000 Washington Avenue, opposite Crown Street.

TO ASSIST MEMBERS and others in studying the collections the services of a docent may be obtained. This service is free of charge to *members of the Botanic Garden;* to others there is a charge of 50 cents per person. Arrangements must be made by application to the Curator of Public Instruction at least one day in advance. No parties of less than six adults will be conducted.

TO REACH THE GARDEN take Broadway (B.M.T.) Subway to Prospect Park Station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, or Tompkins Avenue trolley to Flatbush Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street or McDonald-Vanderbilt Avenue trolley to Prospect Park Plaza and Union Street. BY AUTOMOBILE from points on Long Island take Eastern Parkway west and turn left at Washington Avenue; from Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway, follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN
PUBLICATIONS

RECORD. Established, January, 1912. An administrative periodical issued quarterly (1912–1928); bimonthly (1929–1932); quarterly (1933–). Contains, among other things, the *Annual Report* of the director and heads of departments, special reports, educational *Prospectus, Seed List, Guides.* Subscription, $1.00 a year. *Guide numbers specially priced.* Circulates in 59 countries.

MEMOIRS. Established, July, 1918. Published irregularly. Not offered in exchange. Circulates in 48 countries.

Volume I. *Dedication Papers:* 33 scientific papers presented at the dedication of the laboratory building. 1917. 521 pages. $3.50.

Volume II. The vegetation of Long Island. Part I, The vegetation of Montauk. By Norman Taylor. 1923. 108 pages. $1.00.

Volume III. Vegetation of Mount Desert Island, Maine, and its environment. By Barrington Moore and Norman Taylor. 1927. 151 pages. $1.60.

Volume IV. *Twenty-fifth Anniversary Papers.* 9 papers on 25 years of progress in botany (1910–1935); 5 papers on horticulture. 1936. 133 pages. $1.35.

CONTRIBUTIONS. Established, 1911. Papers originally published in periodicals, reissued as "separates" without change of paging. 25 numbers constitute one volume. 25 cents each, $5.00 a volume. Circulates in 34 countries.

No. 94. Inheritance of smut resistance in some oat hybrids. By George M. Reed. 7 pages. 1941.

No. 95. Breeding work toward the development of a timber type of blight-resistant chestnut: Report for 1940. By Arthur Harmount Graves. 8 pages. 1941.

No. 96. Inheritance of smut resistance in hybrids of Navarro oats. By George M. Reed. 7 pages. 1942.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. Contain popular, elementary information about plant life for teachers and others; also announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each. Circulates in 28 countries. Infrequent since 1936.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication. Issued as numbers of the RECORD; see above.

Guide No. 9. The Rose Garden of the Brooklyn Botanic Garden. 12 illustrations, folded map. By Montague Free. Price, 50 cents.

Guide No. 10. Gardens within a garden: A general guide to the grounds of the Brooklyn Botanic Garden. Second Edition. 57 pages; 21 illustrations. Folded map. By C. Stuart Gager. Price, 25 cents; by mail, 30 cents.

Guide No. 11. List of shrubs, exclusive of conifers, growing outdoors in the Brooklyn Botanic Garden. 32 pages; 5 illustrations. By Charles F. Doney. Price, 25 cents; by mail, 30 cents.

Guide No. 12. Lilacs in the Brooklyn Botanic Garden: Classification, Cultivation, Pathology. 34 pages; 14 illustrations. By Alfred Gundersen, Montague Free, and George M. Reed. Price, 25 cents; by mail 30 cents.

Guide No. 13. Trees in the Brooklyn Botanic Garden. 53 pages; 9 illustrations. By Alfred Gundersen and Arthur H. Graves. Price, 25 cents; by mail, 30 cents.

SEED LIST (*Delectus Seminum*). Established, December, 1914. Temporarily suspended since 1940.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $5.00 a year. Circulates in 48 countries.

GENETICS. Established, January, 1916. Bimonthly, in coöperation with GENETICS, INCORPORATED. Subscription, $6.00 a year. Circulates in 37 countries.